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AGRICULTURE'S ROLE IN HEMISPHERE DEFENSE . . . . .

By Joseph L. Apodaca*

Defense of the Western Hemisphere today is not merely a military problem. Because economic warfare is a vital component of modern war, the economic vulnerability of the Western Hemisphere is a matter of importance. Among the major weaknesses that threaten hemispheric defense are those that stem from the present use of agricultural resources. What is the nature of these weaknesses? What is their specific relationship to intrahemisphere trade and to New World solidarity? What avenues of approach do they suggest? The following article attempts to answer these questions.

Napoleon is said to have remarked that an army marches on its stomach. Figuratively speaking, that is true today. It is also true that modern armies move on wheels, for which rubber is a necessary ingredient. Other raw materials, infinite in number and variety, are indispensable in making the fighting equipment for modern warfare. Agriculture is called upon not only to supply many of these raw materials but also to feed the millions of people in the cities who turn them into fighting weapons. Agriculture's role, therefore, is of vital importance in national defense.

In defense of the Western Hemisphere the place of agriculture is far more significant. Hemispheric defense cannot be limited to adequate land, sea, and air power: since economic warfare is a vital component of modern war, an adequate defense must include economic measures designed to weld the hemisphere into a strong unit capable of withstanding any form of penetration.

On two fronts the defense of the hemisphere is vulnerable economically, and both of these involve agriculture. In the first place, we are not self-sufficient in regard to certain strategic agricultural raw materials. Secondly, we are handicapped by huge hemispheric surpluses of other agricultural commodities produced in common by the American nations. The possibility of being cut off from essential raw materials and the danger of division from within by conflicting economic interests are serious threats to hemispheric defense.

Removal of these two obstacles calls for a greater coalescence of the economies of the American nations. Such action, furthermore, should not be limited to wartime measures; inter-American economic collaboration would be just as necessary in time of peace should the American nations have to deal with a united Europe dominated by one ruler with one trade policy.

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A closer knitting of the economies of the New World nations is highly desirable under even the most favorable conditions of world peace. It is, in fact, indispensable if there is to be a sound basis for intrahemisphere trade. It happens that the same obstacles that weaken hemisphere defense also obstruct two-way trade development between the United States and Latin America. They spring, on the one hand, from the partially competitive character of agriculture in the Americas and, on the other, from the neglect of certain necessary crops in this hemisphere.

The basic pattern of trade between the United States and Latin America is peculiar. The bulk of our imports from Latin America - as much as 80 percent in value - consists of agricultural products. On the other hand, our exports to the Latin American countries are only about 10 percent agricultural, the remainder consisting chiefly of manufactured and industrial items. This contrast would not be significant were it not for the fact that over half the value of our agricultural imports consists of competitive or supplementary items which are also grown in this country. The remainder, about 48 percent, are noncompetitive or complementary items.

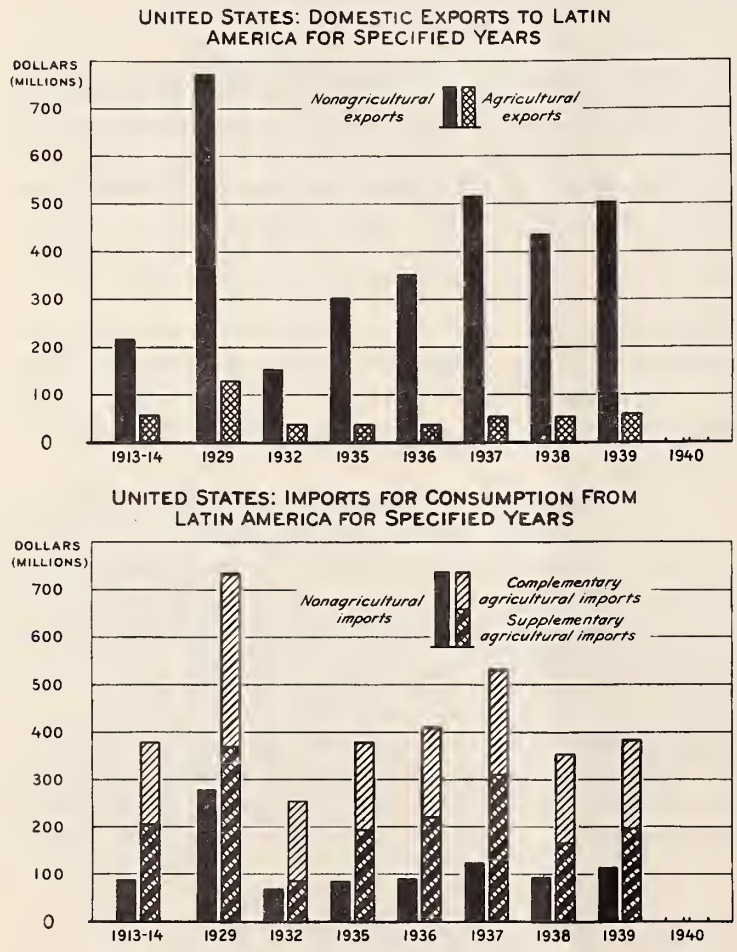

Figure 1.

Everyone knows that a sound and lasting trade expansion implies increased purchases as well as a larger volume of sales. At present the possibilities of an expanding scale of purchases from Latin America are not great. It is not likely, for instance, that our imports of complementary agricultural items now prominent in our Latin-American trade (such as coffee, bananas, cocoa, and spices) will increase appreciably. Most of these now enter free of duty, or at moderate rates, and the consumption of a number of them is relatively inelastic. As for supplementary goods - sugar, cattle hides, dutiable wool, unmanufactured tobacco, flaxseed, and others - increased imports are likely to be discouraged, except in years of short domestic crops, by the tendency to increase production in this country of the same or similar crops. This fundamental obstacle emphasizes the need of developing complementary production to

serve as the basis for inter-American trade. The hemisphere's deficit products, with particular attention to United States needs, indicate the possibilities in this connection. The bulk of the hemisphere's imports of these is consumed in the United States.

HEMISPHERE DEFICIT PRODUCTS

Rubber

Few persons realize the significance of rubber in modern life. Of the estimated 45 million motor vehicles in the world today, over 31 million, or about 68 percent, are operated in the United States. About 73 percent of the rubber used in the United States goes into tires and tubes, but numerous other products, too, require the use of this commodity. A few examples are transmission belts, telephone receivers, balloons, raincoats, rubber bands, footwear, rubber cement, insulating tape, and brake hose.

In the highly mechanized warfare of today the uses of rubber are being multiplied, making this commodity vital for defense. Since the outbreak of the present European war, the United States Government has sought to protect itself against the lack of sufficient rubber supplies. An exchange of United States cotton for rubber obtained through the United Kingdom increased our rubber stocks recently by an amount equivalent to 88,000 long tons. The Rubber Reserve Company, organized by the Reconstruction Finance Corporation, has planned purchases amounting to 330,000 long tons of rubber for delivery by the end of 1941. Should the rubber manufacturers' stocks be 150,000 tons at that time, and if delivery is made according to plans, the United States should have a total of 568,000 long tons to protect it in case the war should interrupt shipments from Far East plantations. Imports of natural rubber into the United States in 1940 were 818,147 long tons, estimated at a value of about 325 million dollars.

Figure 2.- Young rubber trees in Brazil. The Ford Motor Company has about 14,000 acres of rubber in production on its Brazilian plantations. It will be noted that these trees have been budded; this is done in order to utilize the high yielding strains of rubber, which enable America to compete with the low labor costs of the Far East.

Despite the tremendous demand in the United States for natural rubber, there is no production in this country. Approximately 98 percent of our imports comes from British Malaya, the Netherlands Indies, and adjacent areas. Less than 2 percent comes from tropical America - the original source of practically all rubber. Surveys indicate that suitable conditions for growing rubber may be found in at least 15 Latin-American countries, extending all the way from southern Mexico to northern Bolivia. Average annual imports of rubber into the United States in the recent 3-year period 1937 to 1939 were 504,062 long tons, the average value of which is estimated

at $185,652,000. For the most part these purchases were made in a market dominated by the producing countries that signed the International Rubber Regulations Agreement of 1934. These countries at the end of 1934 had nearly 99 percent of the world's rubber plantations.

Quinine

Like rubber, quinine is a native of tropical America. It has had a number of substitutes in recent years, but is recognized as of strategic importance. Since the outbreak of the war in Europe efforts have been made to accumulate stocks of quinine in the United States, with the result that imports of both cinchona bark and cinchona derivatives have reached record levels. A recent Presidential proclamation prohibits reexports from this country other than those under special permit.

The great medicinal value of cinchona bark, from which quinine is extracted, was revealed in 1630. In that year one Señor Canizares, a Spanish magistrate, is said to have been cured of malaria by the use of cinchona. Eight years later cinchona bark was administered to the Countess of Cinchon, also ill with malaria, and both doctor and

Figure 3.-First improved cinchona trees imported into Java 75 years ago stand behind the manager of this government plantation. In foreground are 2-year-old plants; in background, 7-year-old trees soon to be dug up and stripped of bark and roots. (Courtesy *Life Magazine*)

patient were enormously impressed with the favorable results. The Countess thereupon ordered large quantities of the bark for distribution to those suffering from malaria. From the name of this Countess came the term "cinchona," at present used to identify the tree that is a source of quinine. The introduction of the bark into Europe followed, but over 100 years passed before much was known of the cinchona tree.

As in the case of rubber, the seeds of the cinchona tree were taken from South America by the Dutch and planted in Java, where after persistent efforts cultivation on a plantation basis succeeded, and a thriving industry ultimately developed. These plantations, together with efforts to control exports from other producing countries, place the Netherlands' interests in a position to influence materially the world's supply of natural quinine. Imports into the United States are normally almost entirely from the Netherlands Indies. In recent years these imports have averaged 1,738,431 pounds per year, and their average value has been $735,411. Less than 2 percent of this comes from countries in the Western Hemisphere.

Commercial plantings of cinchona trees have been made in Guatemala and Bolivia, and there is every evidence that this important product, now out of the reach of the poorer classes in this hemisphere, can be made available at considerably lower cost. A new product known as *totaquine*, which is not highly refined but contains other alkaloids in addition to quinine, should aid in bringing this important drug within the reach of many who formerly could not obtain it.

Natural silk

Despite a growing number of substitutes for silk, natural silk is still in great demand in the Western Hemisphere and constitutes an important deficit product. Its romantic history shows that it has long been a coveted article. In 2640 B.C., according to records, the Empress of China encouraged the cultivation of the mulberry tree and the raising of silkworms. Both the seeds and the eggs are said to have been carefully guarded, but one story tells of a Chinese princess who concealed them in the lining of her hood and smuggled them out to India. Cortez, in 1522, is credited with the first attempt to establish the silk industry in the Western Hemisphere, but his efforts in Mexico apparently failed. The Orient, with an adequate supply of low-paid labor to take care of the worms and unreel the silk threads of the cocoon, has remained the chief center of world production.

United States imports during 1937 to 1939 amounted to an average of about 54,862,000 pounds per year, with an average value of $105,416,000. The Far East, principally Japan, furnished 97 percent of this total, and Switzerland and Italy accounted for practically all of the remainder. The mulberry thrives in many parts of this hemisphere. Considerable attention has been given lately, particularly in Ecuador and Brazil, to finding mechanical means of handling the silk worms and unreeling the threads of the cocoon. Results have not as yet made it possible to develop production on a commercial scale.

Cacao

Chronicles of the conquistadores state that the Spaniards found in use in the New World a drink which the natives called *chocolath*, made from cacao beans, and that Montezuma and his subjects consumed it in unbelievably large quantities. The white

man soon learned to like *chocolath* and introduced it in Europe, where in the eighteenth century it had become a fashionable beverage. Since then the product has gained widespread favor, and its uses have multiplied.

Figure 4.-Harvesting cacao in Brazil. (Courtesy Pan American Union.)

Though a native of tropical America, cacao - like rubber and cinchona bark - was transplanted to other areas, notably the West Coast of Africa. Unlike rubber, however, it is still grown extensively in the Western Hemisphere. In 1895 about 86 percent of world production was in the Americas, but in 1939 the American countries produced only 39 percent of the world's cacao. American production is insufficient to meet even the needs of the United States. Average annual imports into this country in recent years have amounted to 578,642,000 pounds of cacao and cacao bean, estimated at an average value of $33,361,000. About 48 percent of this total is supplied by tropical America; the remainder comes chiefly from Africa and the Netherlands Indies.

Tea

In the Western Hemisphere tea is second only to coffee in importance as a beverage. The Far East (notably Ceylon, the Netherlands Indies, Japan, and British India) is the source of as much as 95 percent of United States imports of tea. During 1937-1939 our imports amounted to an average of 91,327,000 pounds per year, for which we paid annually $20,256,000.

Small quantities of tea imports into the United States have from time to time originated in tropical America. There are areas in South America all the way from Colombia to Paraguay of excellent environmental conditions for the growing of tea. As yet, however, production of the types of tea consumed in this country has not expanded significantly, though *yerba maté*, a species of holly, is grown extensively in Paraguay, Argentina, and Brazil. There have been attempts to encourage its consumption in the United States.

Tapioca

Among food items, tapioca is of importance. Identified by a variety of names, depending on the place of production, it is known as *mandioca* in Brazil, *yuca* in Cuba, and as *cassava* in the Far East. From the large roots of the plant comes a food

starch, some of which is prepared and used for food under the name of arrowroot and tapioca, and a part made into cassava or mandioca flour and meal. Mandioca flour is used in making bread, cakes, and other pastry products. In addition, the principal industrial uses for this starch include the making of mucilage for postage stamps and envelopes, sizing textiles and paper, and adhesives.

The plant, which is easily cultivated, is a native of South America. It can be grown throughout most of tropical Latin America but grows particularly well in Brazil and Paraguay. It was transplanted to Ceylon in 1786 and to India probably long before that time. It has also been introduced successfully into tropical regions of Africa and the Malay archipelago. The Netherlands Indies is a major source of supply. United States imports in recent years have averaged 348,832,000 pounds, with a value estimated at $5,830,000 a year. Less than 4 percent of this quantity has come from Latin American countries - the remainder originating for the most part in the Netherlands Indies.

Kapok

Another native product of tropical America is the ceiba tree, which produces tree cotton, or kapok. The demand for kapok will probably be stimulated by the rearmament program. Kapok yields a soft, flexible material long used to stuff pillows, mattresses, and chairs. In addition to these uses, kapok is now employed in making life preservers, water wings, sleeping bags, and as insulation material. It has a buoyancy greater than cork and is resilient and water-resistant.

From the American tropics the kapok tree was transplanted to the East Indies, the Philippines, Ceylon, Indochina, and Africa. Today as much as 92 percent of United States kapok imports are shipped from these areas. Of average annual imports of about 9,114 tons per year during 1937 to 1939, valued at $2,474,000, less than 5 percent came from Latin America. In Ecuador there is a type of kapok of greater value than that received from the Far East. So far there has been no effort to make a plantation crop of kapok in this hemisphere, but there is every reason to believe that this could be accomplished.

Figure 5.-A kapok tree.

Rotenone

Rotenone is one of the most valuable insecticides. It is found in the roots, leaves, and stems of certain tropical plants that are identified, according to their

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Figure 6.-Barbasco or cubé, native to the Amazon basin, is a source of rotenone.

various species, by such terms as *derris, barbasco, cubé*, and *timbo*. For hundreds of years the natives of the Far East and tropical America used the leaves and roots of this plant as a fish poison. They would dam the streams and drop in leaves and roots of rotenone-bearing plants to poison the fish and cause them to rise to the surface of the water, where they might be easily caught. But although this product poisons insects and animals, it is not harmful to human beings.

The first English account of the use of rotenone as an insecticide dates to 1848, when Oxley employed a decoction of cube root to control insects on a nutmeg tree. In 1929 the cubé root of plants in certain parts of tropical America was found to contain ample quantities of rotenone, and since then there has been considerable interest in the cultivation of this plant. The growing number of experiments carried on in recent years to find new industrial and medicinal uses for rotenone reflects a growing interest in this valuable insecticide. Entomologists are keenly interested in these plants, especially because their use offers a solution to the spray-residue problem presented by lead arsenate, particularly in the spraying of vegetables.

Imports of rotenone-bearing plants into the United States show a progressive increase from 2,412,576 pounds in 1937 to 5,138,882 pounds in 1939. Estimates indicate that in 1940 imports will be around 7 million pounds, equivalent to 35 million pounds of finished insecticide. The value of these imports has also increased considerably, from $342,799 in 1937 to $521,152 in 1939. Tropical America supplies about 65 percent of the volume imported; practically all of the remainder comes from the Far East.

Fibers

Of the types of fibers used in the manufacture of naval cordage, ropes, cables, binder twine, sacks, and mats, the most important in the light of our imports are sisal, henequen, and manila hemp or abacá. Ordinary hemp is of relatively minor importance. Imports of these four fibers, according to the average of the last 3 years, are equivalent to about 159,000 tons per year. The average annual value of these imports is estimated at $16,348,000. In addition to imports of the fibers mentioned, the United States also imports about 56 million pounds of binder twine each year, valued at approximately 3 million dollars.

From Latin American countries comes 42 percent of the volume of our imports of sisal and henequen fiber, less than 1 percent of manila hemp or abacá fiber, and 7 percent of the ordinary hemp. Of the imports of binder twine, 33 percent comes from

Figure 7.-Bales of abacá (manila hemp) ready for shipment.

Latin American countries. Important suppliers outside the Western Hemisphere are the Netherlands Indies, Africa, the Philippines, and Italy.

Recent surveys indicate that all these fibers can be produced in substantially larger quantities in Latin American countries. In this connection abaca is of particular interest. This is the best hard fiber for ropes, particularly those used on boats engaged in salt-water navigation. To date nothing has been found to take the place of this product, with its resistance to salt water and its advantage of being easy to handle. Efforts are being made to expand production of abaca in Latin America, and there are already 2,000 acres being grown in Panama. The chief drawback appears to be the relatively high cost of cleaning the fiber, but this obstacle would be removed with the perfection of fiber-cleaning machinery.

Fats and oils

Although the Western Hemisphere is nearly self-sufficient with regard to fats and oils as a whole, substantial deficits exist in some categories. Deficits of industrial oils apply primarily to tung and perilla oil, almost indispensable in the manufacture of high-quality varnishes. United States imports of these two oils averaged 162,588,000 pounds in 1937-1939, valued at $16,581,537.

Among the edible vegetable oils, the chief deficits are of coconut oil and palm and olive oils. The total hemisphere deficit of these products amounts to about 1,668 million pounds a year. In addition to their usefulness as food, these oils are essential in the manufacturing of quick-lathering and hard soaps. There are also imports of palm nuts and kernels, as well as of palm oil. The nuts and kernels are processed in the United States, and the oil is used in making soaps, chocolate products, pharmaceuticals, and perfumes. Imports have averaged 40,294,000 pounds in

recent years and originate largely in Africa and the Far East. United States imports of these five products have averaged 796,452,000 pounds, valued at about $33,809,000.

Imports of coconut oil and copra come largely from the Philippines and the East Indies. Peanut oil and tung oil are furnished primarily by the Far East, principally China. The East Indies and West Africa are the chief sources of palm oil and palm kernels, and Europe is the source of olive oil imports. Shipments of perilla oil originate in Kwantung and Japan.

Latin America has two outstanding oils, babassu and cohume oil, and other oils like copra and ben that can be used to replace several of the vegetable oils mentioned. The trees that produce these oils are grown wild, primarily because they are slow-growing and do not lend themselves readily to plantation cultivation. Where they grow in large numbers, however, as in the case of the babassu in Brazil and the cohume in Central America, they may be made the basis for profitable industries. Ben oil is a product of the benzolive tree in Haiti. There are also some palm and coconut oil plantations in tropical America.

Figure 8.--Typical oiticica tree. Note the roots growing downward from aerial stems.

It is believed that the tropical species of tung oil and oiticica oil, natives of tropical America, can produce large quantities of the industrial oils needed by this hemisphere. Recently there has been a great interest in the production of tung oil, in both the southern United States and some of the Latin-American countries. Doubtless some of the tropical varieties of tung will be the most economical producers of this valuable oil. Chia oil is now being produced in Mexico.

Many of the crops furnishing essential oils, including lemon grass, citronella, ilang-ilang, and vertivert, have been thoroughly investigated in Puerto Rica. Others, such as jasmine, tuberose, cassia, and neroli, grow well in the West Indies and offer possibilities in other parts of the Tropics. Oils of rose and lavender might well be produced in the uplands of Ecuador and Guatemala.

Nuts

Cashew nuts and to a less extent coconuts are deficit crops in this hemisphere. Annual imports into the United States of these two have in recent years averaged $4,461,000 in value, with about $223,000, or 5 percent, supplied by American countries. Although both coconuts and cashews enter primarily as food products, they also have industrial uses. Coconut shells are used in making gas masks, water

containers, and a number of decorative objects. Cashews yield a cooking oil, and from the shell is extracted a fluid used in varnishes, brake linings, typewriter rollers, and machine tools.

The coconut palm is so widely distributed in Latin America that it is impossible to trace its origin. No fewer than 10 Latin-American republics, in addition to Puerto Rico and other West Indian islands, export coconuts. The cashew tree, a native of the West Indies, was transplanted to the Far East, and today nearly all our imports originate in British India. Latin America supplies as much as 48 percent of the United States' imports of coconuts, but less than 1 percent of the cashews.

United States imports of the 20 classes of commodities discussed above had an average annual value of about $428,654,000 during 1937 to 1939. Less than 6 percent of this total represents imports from Latin America. The remainder originated in Africa, the Far East, and other distant regions as far as 10,000 to 14,000 miles away.

TABLE 1.—*United States imports of specified tropical products from all countries and from Latin America, 3-year average 1937-1939*

PRODUCT	UNIT	TOTAL IMPORTS		IMPORTS FROM LATIN AMERICA			
		QUANTITY	VALUE	QUANTITY	PERCENT OF TOTAL	VALUE	PERCENT OF TOTAL
Rubber (crude)	L.ton	504,062	185,651,709	7,889	1.6	2,331,262	1.3
Cinchona bark	Pound	1,738,431	735,411	23,855	1.4	2,605	0.4
Sisal and henequen	L.ton	119,404	11,108,886	50,344		4,415,600	39.7
Manila or abacá fiber	L.ton	39,006	5,037,962	103	0.3	5,062	0.01
Kapok	L.ton	9,114	2,474,174	415	4.5	105,966	4.3
Rotenone-bearing roots (including barbasco and cube root)	Pound	3,540,323	415,717	2,303,481	65.1	265,305	63.8
Hemp (unmanufactured)	L.ton	679	200,635	46	6.8	10,507	5.2
Coconuts	Number	37,632,635	572,204	13,000,944	34.5	218,231	38.1
Tapioca	Pound	348,831,687	5,829,958	12,202,882	3.5	279,028	4.8
Cocoa and cacao beans	Pound	578,642,107	33,360,841	278,725,830	48.2	15,355,241	46.0
Coconut oil	Pound	346,037,359	13,225,217	53	-	5	-
Olive oil (edible and inedible)	Pound	92,173,000	11,300,000	-	-	-	-
Tung oil	Pound	120,352,703	14,582,537	1,336	-	94	-
Cashew nuts	Pound	27,461,025	3,889,043	39,433	0.14	4,975	0.13
Peanut oil[1]	Pound	25,770,000	1,162,000	-	-	-	-
Perilla oil	Pound	42,235,333	1,999,000	-	-	-	-
Palm nuts and kernels	Pound	40,293,840	1,056,834	7,376,360	18.3	306,206	29.0
Silk (raw)	Pound	54,861,829	105,415,873	-	-	-	-
Tea	Pound	91,326,634	20,256,207	333	-	78	-
Palm oil	Pound	323,680,085	10,413,904	-	-	-	-
Total			428,688,112			23,300,165	

[1] Domestic supplies of peanut oil have increased considerably since 1939.

Compiled from official records of Office of Foreign Agricultural Relations.

Since many of these products are natives of Latin America and others are readily adapted to that region, why do they not play a more important role in the agriculture of the Western Hemisphere? In many respects it is not surprising that distant areas are now far more important than Latin America in supplying Western Hemisphere requirements. An outstanding reason may be found in the economic liberalism and comparatively free international trade conducive to the operation of the "principal of comparative advantage" of the nineteenth and early twentieth centuries. Economic disadvantages that Latin America failed to overcome were the limited supply of labor in proportion to vast natural resources and the lack of capital and skilled technicians necessary to develop commercial production. These disadvantages meant higher costs in Latin America than in tropical areas of the British, French, and Dutch possessions.

Interest waned in tropical production, and increasing attention was turned to semitropical and Temperate-Zone products. The commercial production of such products as cotton, grains, livestock, fruits, and vegetables flourished in Latin America - aided considerably by the economic liberalism which, until the late nineteen-twenties, made it possible to sell increasing quantities of these commodities in Europe and in other parts of America.

Today, however, a different framework of international trade exists, and the Western Hemisphere finds itself overburdened with wheat, cotton, livestock products, fruits, and other such agricultural commodities contributed by several American nations. The former world commerce in these commodities has been seriously crippled by the growth of protectionism, preferential systems, and economic blocs characteristic of the 1930's, together with the direct barter trade practiced by totalitarian states. Small nations have been drawn within the orbits of totalitarian powers through economic and political pressure. These developments were climaxed by the present European war, which, with its accompanying blockades, has closed the foreign markets for the great majority of the agricultural exports of American nations.

As a result the Western Hemisphere now looks to itself as never before. It seeks to expand trade, so essential to the maintenance of adequate standards of living and political stability and so indispensable in implementing hemispheric cooperation. One of the chief obstacles, however, is that arising from the partially competitive character of agriculture, mirrored in the surplus agricultural products of the Hemisphere.

What are these surpluses, what nations produce them, and to what extent do they hinder economic harmony in the hemisphere? In the following discussion the "surpluses" of specified products are based on the combined net exports of Canada, the United States, and the 20 Republics of Latin America to countries outside the Western Hemisphere during the 4-year period 1935-1938, immediately preceding the outbreak of the present European war. Continental Europe was the market for the bulk of these commodities, and for most of them that market is today practically closed.

HEMISPHERE SURPLUS PRODUCTS

Grains

Wheat, corn, and linseed are the important grains of which there are large hemispheric surpluses. During 1935-1938 importing countries of this hemisphere took annually about 67,507,000 bushels of wheat. Brazil, Cuba, Canada, Bolivia, Paraguay,

and Venezuela accounted for these imports within the hemisphere. The exporting countries, however, in addition to meeting their own needs and the requirements of the countries mentioned, had an annual export volume that averaged 260 million bushels destined to areas outside the hemisphere. Canada furnished 57 percent of this export surplus, Argentina 36 percent, and the United States 7 percent.

Of the corn exports of the hemisphere destined for other areas, averaging annually 252 million bushels, Argentina supplied almost the entire quantity. In the case of linseed, Argentina and Uruguay have accounted for the average exports of 45 million bushels going to countries outside the hemisphere, with Argentina accounting for as much as 95 percent of the total.

TABLE 2.—*Western Hemisphere: average exports, imports, and net export surpluses of grains and fibers, 1935-1938*

ITEM	GRAINS			FIBERS	
	WHEAT (INCL. FLOUR IN TERMS OF GRAIN)	CORN (INCL. CORNMEAL IN TERMS OF GRAIN)	LINSEED	COTTON	WOOL
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bales*	*1,000 pounds*
Average exports ...	327,858	306,859	65,286	7,519	458,824
Average imports ...	67,507	54,807	20,348	518	247,686
Average net exports, or "surpluses"	260,351	252,052	44,938	[1] 7,001	211,138
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Percentage of total supplied by exporting countries	Canada .... 52 Argentina . 33 U.S. ..... 12 Chile, Brazil, Uruguay . 2	Argentina 87 U.S. 12.5	Argentina 95.5 Uruguay . 4.4	U.S. ..... 78 Brazil .... 13 Peru ..... 5 Argentina . 2 Mexico 1	Argentina . 65 Uruguay ... 23 Brazil, Chile, Peru 10
Percentage of total imported by hemisphere countries ..	Brazil .... 42 U.S. ..... 30 Cuba ..... 7 Canada .... 3 Bolivia ... 2 Paraguay .. 2 Venezuela . 1	U.S. .... 73 Canada .. 23 Mexico .. 3	U.S. .... 93 Canada .. 5 Chile ... 2	Canada .... 57 U.S. ..... 38 Colombia, Chile ... 4	U.S. ..... 90 Canada .... 8 Mexico, Brazil, Chile, Argentina, Venezuela, Peru 2
Percentage of net hemisphere exports or "surpluses," supplied by specified countries	Canada .... 57 Argentina . 36 U.S. 7	Argentina 100	Argentina 95 Uruguay . 4	U.S. ..... 75 Brazil .... 16 Peru ..... 5 Argentina . 2 Mexico 2	Argentina . 67 Uruguay ... 23 Chile ..... 5 Peru ..... 3 Brazil 2

[1] In addition the carry-over of cotton in the United States averaged 7 million pounds per year during this period.

Compiled from official statistics of the United States, Canada, and Latin-American countries.

Fibers

Among the fibers, large hemispheric surpluses exist of cotton and wool. Importing countries in the New World take only about 518,000 bales of cotton per year. After these requirements and the domestic needs of the exporting countries are met, an amount equivalent to about 7 million bales annually in recent years has been going to other-than-hemisphere markets. In addition to these hemispheric exports, the United States had an annual carry-over of cotton which during 1935 to 1939 amounted to an average of 7 million bales per year. Of the hemisphere surpluses of cotton destined to outside markets the United States has supplied 75 percent, Brazil 16 percent, Peru 5 percent, Argentina 2 percent, and Mexico 2 percent.

With respect to wool, the average exports from the hemisphere to other areas amounted to 211 million pounds per year during 1935-1938. Argentina and Uruguay supplied 90 percent; Chile, Peru, and Brazil accounted for the remainder.

Livestock products

The Western Hemisphere depends on other areas to absorb its meat, meat products, hides, and skins. An average of 1,240 million pounds of beef and beef products is exported annually to outside markets, over 90 percent to Europe. These exports are supplied principally by Argentina, with Uruguay and Brazil supplying minor portions.

TABLE 3.—*Western Hemisphere: average exports, imports, and net export surpluses of livestock products, 1935-1938*

ITEM	HIDES AND SKINS	PORK PRODUCTS	MUTTON AND LAMB	BEEF AND BEEF PRODUCTS
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Average exports	671,397	496,426	130,148	1,445,710
Average imports	314,352	93,244	8,290	205,143
Average net exports, or "surpluses"	357,045	403,182	121,858	1,240,567
	Percent	*Percent*	*Percent*	*Percent*
Percentage of total supplied by exporting countries	Argentina 53 Brazil 19 Uruguay 9 Canada, U.S. 11	U.S. 45 Canada 40 Argentina 12 Brazil 3	Argentina 86 Uruguay 13	Argentina 73 Uruguay 14 Brazil 8
Percentage of total imported by hemisphere countries	U.S. 87 Canada 11 Brazil, Chile, Cuba 1	U.S. 48 Cuba 44 Mexico, Canada, Peru, Brazil, Argentina 1	U.S. 98 Canada 2	U.S. 88 Canada 6 Cuba 3 Chile, Brazil, Argentina 3
Percentage of net hemisphere exports, or "surpluses," supplied by specified countries	Argentina 65 Brazil 23 Uruguay 11 Canada 1	Canada 44 U.S. 40 Argentina 13 Brazil 3	Argentina 86 Uruguay 13	Argentina 76 Uruguay 15 Brazil 9

Compiled from official statistics of the United States, Canada, and Latin-American countries.

As for mutton and lamb, the exports to outside countries in recent years have amounted to an annual average of 122 million pounds, supplied entirely by Argentina and Uruguay. Argentina alone supplies 86 percent of the total. Hides and skins, too, are supplied chiefly by Argentina, with Brazil, Uruguay, and Canada contributing minor portions. Average exports of hides and skins in recent years to countries outside the hemisphere have amounted to an average of 357 million pounds per year. Hemisphere exports of pork products are estimated at 403 million pounds per year for 1935-1938. Of this total, destined to distant markets, Canada furnished 46 percent, the United States 40 percent, and Argentina and Brazil the remainder.

TABLE 4.—*Western Hemisphere: average exports, imports, and net export surpluses of coffee, sugar, and tobacco, 1935-1938*

ITEM	COFFEE	SUGAR	LEAF TOBACCO
	1,000 pounds	*Short tons*	*1,000 pounds*
Average exports	3,061,567	3,840,699	561,600
Average imports	1,894,124	[1] 3,713,402	92,700
Average net exports, or "surpluses"	1,167,443	127,297	468,900
	Percent	*Percent*	*Percent*
Percentage of total supplied by exporting countries	Brazil 63; Colombia 17; Venezuela 3; Guatemala 3; Costa Rica 2; Mexico 2	Cuba 74; Dominican Republic 13; Peru 9; United States, Brazil, Haiti 4	U. S. 78; Brazil 13; Cuba 5; Dominican Republic 2
Percentage of total imported by hemisphere countries	U. S. 94; Argentina 3; Canada 3	U. S. 81; Canada 13; Chile 3	U. S. 74; Argentina 13; Uruguay 3; Brazil 2
Percentage of net hemisphere exports, or "surpluses," supplied by specified countries	Brazil 69; Colombia 19; Guatemala 4; Venezuela 3; Mexico 3; Costa Rica 2	Cuba 76; Dominican Republic 13; Peru 9; Brazil 1; Haiti 1	U. S. 77; Brazil 15; Cuba 6; Dominican Republic 2

[1] Shipments to United States from Puerto Rico and Hawaii not included.

Compiled from official statistics of the United States, Canada, and Latin-American countries.

Sugar

During 1935 to 1938 importing countries in the Western Hemisphere took annually about 3,713,000 short tons of sugar. The United States and Canada absorbed the bulk of these imports. The exporting countries, after supplying their own requirements and those of the importing American countries, still had an export surplus of about 127,000

short tons. Cuba alone accounted for about 76 percent of this total, while the Dominican Republic, Peru, Brazil, and Haiti supplied the remainder.

With reduced quotas on sugar imports into the United States (the initial 1941 quota of 6,616,817 short tons is the lowest since 1936), coupled with the present difficulties of selling in Europe, the exporting nations have faced an acute surplus problem, particularly because of their heavy dependence on income derived from sugar.

Coffee

Coffee is probably exported by more countries of the Western Hemisphere than any other surplus product. Importing countries of the New World take over half the hemisphere's supply. The imports of these countries averaged 1,894 million pounds per year between 1935 and 1938. In addition to supplying these requirements, the exporting countries sold about 1,167 million pounds to outside areas. In estimating the export surplus of the hemisphere, there should be added the coffee destroyed by Brazil during 1935 to 1938 because of a lack of profitable markets. This amounted to an average of approximately 245 million pounds per year.

During 1935 to 1938 Brazil accounted for about 69 percent of the hemispheric surplus of coffee; Colombia, Guatemala, Venezuela, Mexico, and Costa Rica, in the order named, supplied most of the remainder. Faced with a surplus problem increasingly severe since the outbreak of war in Europe, the American coffee-producing countries and the United States concluded an International Coffee Agreement on November 28, 1940.

Leaf tobacco

Tobacco enters intrahemisphere trade to some extent, for there are a number of producing countries, like the United States, that export some types of tobacco and import certain other complementary types. After all this intrahemisphere trade is accounted for, however, there has still remained in recent years an average of 469 million pounds for outside markets. Of this total the United States has supplied 77 percent, Brazil 15 percent, Cuba 6 percent, and the Dominican Republic 2 percent. The United States surplus is largely of cigarette-type leaf; that of the other countries named is chiefly of cigar-type.

Fruits

Oranges, apples, and pears are fruits for which the Western Hemisphere has looked to outside markets for disposal of export surpluses. This has applied annually to a volume of about 6.5 million boxes of oranges, 16 million boxes of apples, and 3 million bushels of pears. The United States and Brazil account for almost all the orange exports; the United States, Canada, Argentina, and Chile supply the apples. The export surplus of pears originates in the United States, Argentina, and Chile. In the hemisphere exports of these three fruits the United States is the leading supplier.

Pressure of surpluses

With respect to surpluses, therefore, no less than 15 agricultural commodities may be classed as hemispheric surplus products. This list includes only the items

produced by two or more nations of the New World and for which an adequate solution of the problem would involve action on the part of more than one country.

It is difficult to estimate the value of these export surpluses, since a number of countries are involved whose currencies were subject to wide fluctuations in value during the 1935-1938 period. Based on unit prices corresponding to United States imports or exports of similar articles in 1938, the total value of the hemisphere's net export surpluses of the 15 commodities considered is estimated at 1.38 billion dollars.

These surpluses weigh more heavily on some countries than on others. Six American countries, for instance, supply only one commodity to the list of surplus products. That commodity is coffee, and the hemisphere surplus is created by Brazil and countries of northern South America, Central America, and the West Indies. With few exceptions these coffee-exporting countries rely heavily on the income derived from that product.

Figure 9.

Conspicuous among the countries supplying more than one commodity to the list is Argentina, which produces for export 10 items that enter into hemispheric export surpluses.[1] That these 10 items are important in Argentina's economy is shown by the fact that in 1938 they accounted for about 83 percent of the total value of Argentine exports. North of Argentina is Brazil, a country that exports 9 items included in the list of hemispheric surpluses.[2] These items were the source of about 75 percent of Brazil's total receipts from export trade in 1938. Uruguay, which lies between

[1] Wheat, corn, linseed, wool, hides and skins, pork products, mutton and lamb, beef and beef products, and fruits.

[2] Cotton, coffee, sugar, wool, hides and skins, pork products, beef and beef products, tobacco, and oranges.

Argentina and Brazil on the South Atlantic, exports 5 of the commodities of which there are hemispheric excesses.[3] Again we find that these are vital to the economy of the country, since they have yielded as much as 81 percent of the country's income from foreign trade.

West of Argentina is Chile, with surpluses of wool and fruits which it contributes to the hemisphere's total, though these represent only a small portion of the value of that country's total exports. Northwest of Chile lies ancient Peru, burdened with excesses of cotton, sugar, and wool, all of which have added to the hemisphere's total surpluses. Peru depends on these products for about 30 percent of its receipts from foreign trade.

A striking parallel exists between the southern half of South America on the one hand (including sections of Brazil, Uruguay, Argentina, Chile, and Peru) and, on the other, the region covering the United States and Canada. These two geographically opposite regions in the Western Hemisphere combine to supply hemisphere surpluses of a number of products, notably wheat, cotton, pork products, oranges, apples, and pears. Here are two wide areas in the hemisphere that from an agricultural standpoint are most difficult to reconcile.

In the West Indies, Cuba contributes heavily to the hemispheric export surplus of sugar and, to a lesser extent, of tobacco. These two products in 1938 represented as much as 88 percent of the total value of Cuba's export trade. Sugar, tobacco, and to some extent, vegetables, are the backbone of the Cuban economy.

Foreign trade is the lifeblood of the economy of all the Latin American countries mentioned. Their great dependence on export outlets outside the Western Hemisphere would be expected to make them exceedingly cautious of any action that would jeopardize these markets. For this reason it is difficult for them to favor wholeheartedly the idea of Pan-Americanism, when that program may imply the loss of the export markets provided by the totalitarian powers. There can be no doubt that the problem of agricultural surpluses is one that divides the Americas. Today, when conditions in the world call for solidarity and collective action on the part of the American nations, this problem threatens to stalemate efforts looking toward inter-American solidarity, so vital to hemisphere defense.

It is apparent, therefore, that a greater coalescence of the economies of the Western Hemisphere is necessary both for the sake of implementing hemisphere defense and in order to provide a sounder basis for inter-American trade expansion. If this is to be fully attained it is important that both the deficit and surplus problems of hemispheric agricultural economy be given serious consideration.

Although the primary purpose of this study is to determine the scope of the problem, it seems advisable to mention the work already under way and the measures that appear desirable in knitting more closely the economies of the Western Hemisphere.

COOPERATIVE MEASURES

Efforts are now being made to produce in Latin America the tropical crops that complement our present production and for which a profitable market exists in the

[3] Linseed, wool, hides and skins, mutton and lamb, and beef and beef products.

United States. This is, of course, a long-range undertaking. Congress appropriated a half-million dollars in June 1940 for the development of rubber production in tropical America. As a result 25 scientists from the United States have recently been sent to different parts of Latin America to work on rubber production. They have established 10 nurseries and are growing hundreds of thousands of seedlings upon which will be grafted high-yielding strains of rubber. It is an accepted fact that the prerequisite of a self-sustaining rubber industry capable of competition with the Orient is high-yielding, disease-resistant plant material. With the successful development of such material, it is believed that the rubber industry will to a considerable extent return to its original home in the New World.

Exploratory surveys undertaken during the past 3 years in Ecuador, Paraguay, Haiti, Colombia, and Cuba, at the request of the governments of these nations, indicate that possibilities are promising for expanding the production of many other deficit tropical crops. Authority for these surveys was granted through Public No. 63, 76th Congress, "An Act authorizing the temporary detail of United States employees, possessing special qualifications, to governments of the American Republics and the Philippines . . .," approved May 25, 1938.

Some people feel that the production of these products in the Western Hemisphere and their purchase from Latin America rather than from the so-called "natural" sources - like the Dutch, British, and French possessions in Africa and the Far East - would contribute nothing to world commerce; that, in fact, it would weaken the buying power of these areas for the Temperate-Zone products of the United States and its southern neighbors. In answering this objection it is first necessary to recall that even before 1930, when international commerce operated on a relatively uninterrupted basis, some of the more important of these tropical products - such as rubber and quinine - were sold under conditions of monopoly. Present world developments, moreover, threaten to result in serious commercial and political disturbances in distant areas now supplying our requirements, a fact that imperils the defense of the Western Hemisphere. Finally, there is good reason to believe that rising standards of living in tropical America will increase consumption there of all products and services, not only from neighboring American countries but from other countries as well. It is certain that as long as the American nations are impoverished by excessive supplies of products for which very limited markets exist, there is little likelihood that they will be good customers for anyone.

Moreover, the development in tropical America of complementary crops for which a profitable market exists in the United States may be said to provide the opening wedge for measures designed to lessen the burden of the surplus commodity situation. Indirectly, this is true for two reasons: (1) To the extent that capital and labor are utilized in production of tropical crops there will be less incentive to expand production of Temperate-Zone crops, for which these countries are not so well suited, and more incentive to purchase these goods from neighboring American nations; (2) the new industries may be expected to increase the buying power of the tropical American countries for goods of all types, including such items as wheat, cotton, sugar, and fruits.

More direct measures should be undertaken to correct the surplus problem, but such measures are doubtless facilitated by the fact that a concrete developmental program has been set in motion designed to stimulate inter-American trade. One of

these direct measures might well be the establishment of relief distribution systems throughout the hemisphere - perhaps modeled on the system now in existence in the United States - in order to make surplus goods available to the underprivileged thousands who cannot now buy them. This might be supplemented by the exchange of the surplus products of one country for those of another, if they do not happen to be the same, and by distributing these through relief channels. In addition, certain tropical countries might agree to lower their high tariffs on wheat, cotton, and fruits, which they are trying to produce at excessive costs, and thus make available to their own people larger quantities of these goods.

The combination of these measures should increase consumption in the hemisphere, but it would only begin to touch upon the serious problem of accumulating surpluses. Stronger action will be needed, especially since as the war continues the regular commercial European outlets for Western-Hemisphere surpluses will be drastically curtailed and so will be substantially below the pre-war level.

It is probably a recognition of this fact, coupled with the critical situation faced by producing countries, that recently led to international action with respect to coffee. An Inter-American Coffee Agreement was signed on November 28, 1940, by 15 American republics, including the United States. The essential feature of this agreement is the allocation of basic quotas to the coffee-producing countries of this hemisphere, with regard to both the United States market and the markets of other countries. It is the first agreement of its kind entered into by nations of the Western Hemisphere, and it may well serve as an impetus for similar measures with respect to other hemisphere surplus products.

The mere mention of international commodity agreements often elicits the criticism that such agreements are primarily intended to increase profits by imposing restraints on competition, and that they cannot be reconciled with an increase in general consumption. In a sellers' market such a charge may be valid. With respect to wheat, cotton, corn, coffee, and other hemisphere surplus products, however, the situation is different. It simply is not possible, for example, for American nations to sell a total of approximately 1 billion bushels of wheat to importing nations outside the hemisphere that can now take less than 250 million bushels; and that is substantially the situation today. The aim of commodity agreements for these products is that of preventing a critical financial situation which may easily give rise to political disorders in particular Latin-American countries.

Here again it is evident that we cannot separate the political from the economic situation, and that both have a definite bearing on hemispheric stability. In this connection it might well be recalled that when the war is over the European Continent will be in desperate need of food and fibers that can be supplied by the Americas. If American sellers are economically strong and united, they may well use their supplies as effective guards to maintain and increase their freedom and strength. If they are economically unstable and disunited, these supplies may be a source of weakness instead of strength.

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AGRICULTURE IN BRITISH MALAYA . . . . .

By W. I. Ladejinsky*

Before the turn of the century the economy of British Malaya rested on tin-mining, developed by the Chinese, and on primitive agriculture carried on by the Malays. The country was known internationally for its tin, rather than for its agricultural products. The introduction of rubber toward the end of the nineteenth century has wrought a real economic revolution in Malaya. Plantation rubber developed so fast that before long the country became the largest producer and exporter of this commodity, and rubber came to be the foundation of Malaya's economic development. This achievement, however, brought in its wake certain important limitations, for the economic well-being of no other country is so bound up with the rise or fall of the price and demand of a single commodity. The emphasis on rubber planting led to the neglect of cultivation of other crops, particularly food crops. As a consequence Malaya must depend on imports for two-thirds of its food requirements, a condition not altogether advantageous under peace conditions and especially undesirable in wartime.

PHYSICAL BACKGROUND

Geographic Position

The Malay Peninsula, a narrow tongue of land occupying the extreme southeastern corner of Asia, lies midway between India and China. The peninsula extends from a little over 1° north latitude to the Isthmus of Kra, 10° north, but that region which may properly be called British Malaya lies between 1° and 6°30' north latitude and between 100° and 105° east longitude. To the north it borders on Burma and Thailand (Siam); to the northwest on the Bay of Bengal, across which is India. The west coast of Malaya is washed by the Straits of Malacca, beyond which lies northern Sumatra, and the east coast by the South China Sea, part of the Pacific Ocean. On the south is the island of Singapore, separated from the peninsula by a strait about a mile wide. South and east of Singapore are numerous islands of the Netherlands Indies.

The area of British Malaya, amounting to 50,880 square miles, is small compared with that of the neighboring Netherlands Indies, estimated at 735,000 square miles. In other words, Malaya is about the size of peninsular Florida. Despite its relatively small area, Malaya is a conglomeration of a number of states and islands (fig. 1). All of these are grouped into three main divisions: the Straits Settlements, known as a British Crown Colony, occupying 1,260 square miles; the Federated Malay States (four states), with 27,540 square miles; and the Unfederated Malay States (five states), with 22,080 square miles.

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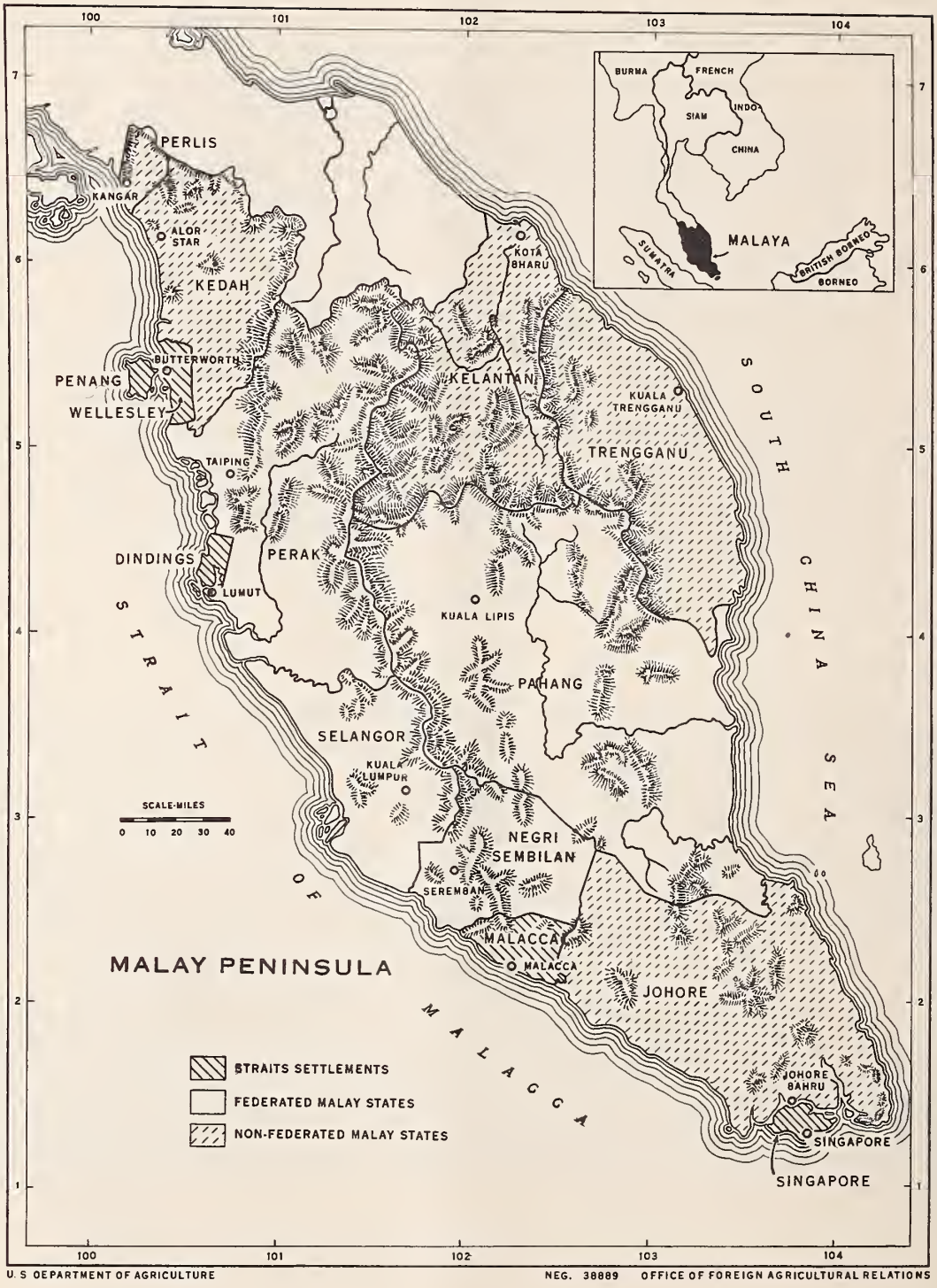
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Figure 1.

Topography, Climate, and Soil

British Malaya is a mountainous country. Extensive plateaus are practically absent, the exception being the Cameron Highlands. Lowlands border the coasts, but small stretches of low-lying, marshy land are also found in the interior. More than two-thirds of the country is covered with mangrove forests that fringe considerable stretches of the coastline. It is not the forests, however, but the available coastal plains, chiefly west of the mountain ranges, that have placed their imprint upon the economic development of Malaya. Lack of natural harbors on the east coast, the violent northeast monsoon that renders navigation difficult, and relative scarcity of agricultural and mining lands are responsible for the slow economic development of the eastern section of the peninsula.

With Singapore only 75 miles north of the equator, the climate of British Malaya is tropical. However, the excessive heat that characterizes continental tropical areas is not encountered in Malaya. For the country as a whole the maximum day temperature is usually about 90° F. and that of night about 75°. This comparatively moderate temperature, however, in addition to the absence of bracing winds, gives rise to high humidity, which is perhaps the only adverse feature of Malaya's climate. In British Malaya, as in the Netherlands Indies, the only variation in the almost uniform climate throughout the year is caused by the changes in volume of rainfall. The country knows no dry season, since the number of rainy days during the year varies from 160 to 200. The actual precipitation varies considerably from region to region, depending on the nature of the monsoon winds and elevation. The maximum and minimum precipitation are about 240 inches (high in the hills) and 65, but the average for the entire peninsula is estimated at about 100 inches per year.

The soils of the Malay Peninsula are not so fertile as those of volcanic origin found in Java and in parts of Sumatra, but some of them are well adapted for the cultivation of rice and tropical crops. Two chief types of soil predominate in Malaya. The first of these consists of granite soils formed through the rapid weathering of rocks, which takes place in the hot, moist climate of the tropics. Usually such soils ". . . are poor in the mineral essentials for plant growth."[1] The coastal and inland alluvial soils, which constitute the second type, are considered the best in Malaya, but even these are not very rich. Their fertility depends less on the inherent qualities of the soil than on the ". . . optimum conditions of temperature and rain, and on the intensive weathering always rendering small amounts of plant food available."[2]

POPULATION: ECONOMIC GROUPS

Density of Population

Unlike many parts of the Netherlands Indies,[3] British Malaya is a sparsely populated country. The total number of inhabitants in 1938 was estimated to be about 5.3 million, or an average of about 104 persons per square mile. The most thickly populated part of the country is the Straits Settlements, where the average number of

[1] Grist, D. H., *An Outline of Malayan Agriculture*, Kuala Lumpur, 1936, p. 5.
[2] *Ibid.*, p. 6.
[3] *Foreign Agriculture*, Sept. 1940, p. 516.

persons per square mile is 1,080. However, the area of the Straits Settlements is very small. In the larger Federated Malay States and Unfederated Malay States the density of population is 77 and 84 persons per square mile, respectively.

Chinese

The population of British Malaya consists of Malays, Chinese, Indians, and a sprinkling of Europeans. The significant factor in the population problem of the peninsula is that although the Malays are the aborigines of the country, they are outnumbered by the Chinese, who have come in a constant stream from Southern China. Very often the numerical strength of a group has no relation to its economic power; however, this is not true of the Chinese in British Malaya. Many of them are coolies, but many others are skilled artisans, an occupation which, like that of retail trade, they virtually monopolize. In addition, considerable numbers of them are mine, plantation, and real estate owners, contractors, and bankers. It may be said, indeed, that the Chinese comprise British Malaya's typical capitalistic society.

Malays

The Malays are in more than one sense the very antithesis of the Chinese. With few exceptions, they shun or are unable and unwilling to engage in most of the occupations in which the Chinese predominate. They live in the country, close to the land, in an environment conservative and static. The basis of their existence is largely agricultural, and their standard of living is low. In the Straits Settlements, where the proportion of Malays engaged in commerce is highest, only 1 in 25 is so employed, and in the remainder of the country the proportion is about 1 in 70. Government work is absorbing increasing numbers, but the total thus occupied is still small. Rubber and tin are the mainstays of Malaya's economy, but the natives have no share in the tin and only a limited share in the rubber.

The revenue received by the natives from their rubber, coconut, rice, and minor crops is not sufficient to place them among the economically privileged groups of Malaya. Official agricultural statistics do not reveal the income of the native farmers, but the total revenue of the Federated Malay States shows an increase from $4,478,498 in 1896 to an all-time high of $59,080,000 in 1927. The Federation's total exports jumped from $15,078,200 in 1896 to $250,739,235 in 1926. These figures indicate the phenomenal economic progress achieved in the course of some three decades, but Singapore, Europe, America, and China have been the beneficiaries.

Indians

The Indians, who have migrated to British Malaya chiefly from Burma, number about 767,000, or 14 percent of the population. Their contribution to the economic upbuilding of the country has been considerably less than that of the Chinese, but in certain pursuits they are well represented. They are known as money lenders, shopkeepers, and clerks in government and commercial offices, but the majority of them earn their living as laborers. Some work in the tin mines of Perak, and others comprise almost the entire labor force of the Public Works Departments and the municipalities. Most of them, however, work on the rubber plantations, where they are considered the most reliable laborers.

Europeans

Europeans in British Malaya number only about 24,000, or 0.4 percent of the total population, but as in all other colonies they occupy all the commanding positions, whether of a civil-service or economic character.

LAND UTILIZATION

As in practically all other oriental countries, agriculture has always been Malaya's basic industry. The introduction of rubber merely accentuated the agricultural character of the country; nor has the situation been altered by the tin mines for which British Malaya is so well known or the few industrial enterprises. Agricultural exports account for over two-thirds of the total value of the country's exports. It is true that according to the census of 1931 only 26 percent of the working population was directly engaged in agriculture, but indirectly a much larger proportion of the population derived its livelihood from the land.

In 1938 the total crop area of Malaya was estimated at over 5 million acres. Before and shortly after the turn of the century, the cultivated area was less than half that amount. The subsequent increase was due mainly to the development of the rubber industry, for the use of which there were readily available land reserves. In the past decade, however, no change in the volume of utilized land has occurred, chiefly because the rubber restriction schemes have put an end, at least for the present, to further expansion.

The country's rapid agricultural development has not exhausted its land resources. The land now under cultivation represents only 13 percent of the total area of Malaya, but although detailed information on potential land utilization is not available, rough estimates indicate that Malaya could double its present crop area.

The land reserves yet to be exploited are in the Federated and Unfederated Malay States, for 56 percent of the land in the Straits Settlements, or all the land that possibly can be put to agricultural use, is being utilized. Although considerable sections of agricultural land are found in Perak, Selangor, and Negri Sembilan, this is particularly true of the State of Pahang, where nearly 3 million acres of such land is concentrated. Altogether the unalienated land area of the Federated Malay States suitable for cultivation is estimated roughly at 3.7 million acres.[4] There are large untouched areas in the Unfederated Malay States, but official information on this point is so meager that even a rough approximation cannot be made.

Although the future utilization of the existing land reserves cannot be determined with any certainty, the manner in which Malaya's 5 million acres are now exploited is revealing. Of the 16 recorded crops, rubber alone in 1939 accounted for 64.5 percent of all cultivated land, while rice and coconuts were responsible for 14.2 and 11.6 percent, respectively. The three crops together comprise 90.3 percent of all the croplands. The remaining 9.7 percent of the land is taken up by 13 other crops.

The striking feature of these figures is that agricultural Malaya puts most of its eggs in one basket. Since so much land is devoted to rubber and the entire rubber output is exported, any slackening in demand, usually accompanied by low prices, spells

[4] *Handbook to British Malaya*, 1935, p. 146.

depression for Malaya. The utilization of so much land for rubber has had a very detrimental effect on the country's food supplies. Many natives have been neglecting or considerably reducing their acreage of rice, which is Malaya's principal food, for the sake of planting rubber trees. The net result is that British Malaya, with a population of 5.3 million and an area of 50,880 square miles, produces only slightly more than one-third of its food requirements.

Small- vs. Large-Scale Farming

Agriculture in Malaya falls into two distinct systems: native and foreign. The two types differ in a number of fundamental respects, particularly with reference to the size of the holdings. Although the average native farm does not exceed a few acres, a European plantation ranges from a hundred acres to several thousand. The Chinese-owned estates, however, are ordinarily much smaller than the European. The methods of cultivation are adapted to local conditions, which equally affect large and small holdings, but methods of the large estates are modified by application of agricultural science. The plantations stress planting of high-quality and high-yielding strains and careful preparation of the product for the market. The native farmers, on the other hand, continue to rely chiefly on traditional methods.

The problem of cost of production, which the European planters are constantly striving to lower, does not figure so prominently in the case of the native producers, because they cultivate the fields themselves. The plantations concentrate on the growing of one crop, exclusively for export, the work being done by hired labor; the native farmers cultivate a variety of crops, only a small portion of which is intended for shipment abroad.

One feature common to both large- and small-scale farming in Malaya is the use of primitive implements, though some large plantations utilize modern equipment such as improved plows, tractors, and cultivators. The primary cause underlying this situation is an abundant supply of cheap labor, but the fact that the workers on the plantations are unfamiliar with the use of modern equipment, together with the nature of the crops grown there, contributes to the failure to use improved agricultural implements.

The available data regarding the distribution of Malaya's 5 million acres of cropland between the large- and small-scale systems are not clear-cut. However, a rough estimate may be made of the aggregate acreage of the small holdings of a few acres by using the figure for an area cultivated by natives. This area is 2,150,000 acres,[5] or 43 percent of all the land under cultivation. The remainder of the cultivated land of Malaya is chiefly in plantations of more than 100 acres each.

AGRICULTURAL PRODUCTION

Malayan crops fall into two groups: major and secondary, or minor. The major crops include rubber, rice, coconuts, oil palms, and pineapples; and the minor include 11 crops, with an area of 278,000 acres, or 5.5 percent of Malaya's 1938 total crop acreage.

[5] Not including 91,000 acres in rubber classified as holdings of more than 100 acres.

Rubber

Rubber has determined the pattern of Malaya's development for more than three decades. The country's rubber acreage accounts for two-thirds of the total crop area, or about 40 percent of the world rubber acreage; its output in recent years amounted to 42 percent of the world total; and the value of Malaya's rubber exports constituted approximately 50 percent of all products exported from the country, or about four-fifths of all agricultural exports. The preponderance of this crop places it in a pivotal position around which Malaya's economy turns.

The growth of the rubber industry[6] in Malaya was very slow. The period between the early experiments and the first commercial plantings lasted 25 years, and as late as 1905 the annual production of plantation rubber was only 150 tons. At about this time, however, the automobile was beginning to come into its own, greatly stimulating demand. By 1910 output of plantation rubber amounted to 10,000 long tons, compared with the all-time high of 83,000 tons for wild rubber. Profits were enormous, as shown by the fact that for the 3 years 1909-1911, when the bearing area in Malaya increased from 40,000 to 150,000 acres, dividends were estimated at 60 million dollars.[7]

Rubber planting in British Malaya was greatest in the first two decades of the century, and in 1921 the total amount of land in rubber was estimated at 2.2 million acres. High prices caused an addition of another three-fourths of a million acres between 1921 and 1929. Despite the low prices of the past decade rubber acreage increased, chiefly during 1929-1934, by 471,000 acres, thus raising Malaya's 1939 rubber area to 3,442,649 acres. Not all of this area is mature, and not all of the mature area is tapped, some of it being rested or abandoned altogether. If the proportion of the tapped to the total area of 1938 holds true for 1939, then the tapped area in that year may be estimated at 2.41 million acres.

Large- vs. Small-Scale Rubber Growing

The Europeans were the first to plant rubber, but before long the natives followed suit, sometimes to the exclusion of other crops. This development assumed such proportions that fear was expressed that the native industry might not only catch up, but might actually displace the European, or estate, industry. Some basis was provided for this fear by the fact that in 1936 nearly 47 percent of the output of planted rubber the world over was produced under native or Asiatic auspices. In Malaya native output supplied only one-fourth of the country's production.

In 1938 the area of estate rubber was estimated at 2,031,969 acres, or 61.6 percent of the total. This acreage was distributed among 2,509 plantations, ranging from 100 to 10,000 acres. The actual distribution according to size shows that plantations from 1,000 to 5,000 acres each make up 51.8 percent of the total acreage, and those over 5,000 acres 19.5 percent of the total plantation area. The remainder is in holdings ranging from 999 down to 100 acres.

Europeans do not possess a monopoly of large-scale rubber cultivation, though they own 75 percent of all the estate land (table 1), and with some exceptions the

[6] For a more detailed account of the early history of rubber development in the East see *Foreign Agriculture*, Sept. 1940, p. 538.

[7] Maclaren, W. A., *The Resources of the Empire*, London, 1924, p. 32.

average size of their plantations is greater than that of other groups. Although the number of Chinese estates exceeds that of the European, Chinese estates are but one-fifth the size of the latter, and they represent 16 percent of all estate land. "Other" (table 1) includes plantations of over 100 acres, owned chiefly by Japanese and Malays. The relative standing of these two groups is not revealed in the 1938 data, but in 1934 the Japanese owned 57,000 acres, or 1,600 acres per estate, whereas the Malays stood at the bottom of the list with not more than 12,000 acres, or 203 acres per estate.[8]

TABLE 1.—*Rubber estates of British Malaya by nationality, 1939*

RACE	ACREAGE	PERCENT OF TOTAL ACREAGE	NUMBER OF ESTATES	AVERAGE ACREAGE PER ESTATE
European	1,530,420	75.3	996	1,536
Chinese	322,641	15.9	1,053	306
Indian	87,795	4.3	369	238
Other	91,113	4.5	91	1,000
Total or average	2,031,969	100.0	2,509	811

Rubber Statistics Handbook, 1939, Singapore.

Rubber holdings of less than 100 acres cover an area of 1,264,678 acres (1938), but not all of this land is owned by the natives. In 1934 practically the same rubber area was distributed as follows:

TABLE 2.—*British Malayan rubber holdings of less than 100 acres, by nationality, 1934*

RACE	ACREAGE	PERCENT OF TOTAL ACREAGE	NUMBER OF HOLDINGS	AVERAGE ACREAGE PER HOLDING
Malayan	693,591	55	165,000	4.2
Chinese	378,322	30	21,000	18.0
Other	189,161	15	16,000	17.0
Total or average	1,261,074	100	197,000	6.4

Compiled from official sources.

The most significant characteristic of the distribution of all the land under rubber in Malaya is that the natives, unlike those of the Netherlands Indies, possess only 22 percent of such land. Even the Chinese share (23 percent) is somewhat larger than that of the natives. Like those of native properties throughout the Middle East, the average size of a Malay holding is very small - slightly over 4 acres. It should be noted, however, that the number of native holdings in Malaya is not synonymous with the number of owners, since one individual may control three or four holdings.

[8] Lewis, Harrison, *Rubber Regulation and the Malayan Plantation Industry*, U. S. Dept. Com., 1935, p. 14.

Not being an employer of labor, the native rubber grower need not maintain an expensive managerial staff, pay bonuses and sick benefits, or incur a host of other expenses shouldered by the estates. The numerous charges carried by the estates are counterbalanced by higher yields per tree. In the middle 1930's the capital invested in an acre of mature rubber trees on a plantation ranged from $180 to $210; in a native holding the per-acre investment was but a fraction of these amounts. On the whole, therefore, plantation owners must look on their properties as a capital asset. Under normal conditions they have to arrange their tapping and planting to insure continuous production over an extended period. The native has an entirely different approach; he regards his property merely as a source of immediate income.[9]

As a consequence of this difference the output of native rubber is less affected by the fall of prices than is the production of the estates. For great numbers of Malayan natives rubber is the only cash crop, if not the only crop, and in order to secure their minimum subsistence they tend to increase tapping when prices are declining. The natives are in a position to take immediate advantage of rising prices following a period of depression. On the other hand, the plantations tend to curtail their operations when prices are falling.

Part of the estate labor supply is repatriated in time of depression, and when prices begin to rise, workers must be recruited and imported before the estates can attain full production. The situation of the native producer is different when the price of rubber is maintained at an even level over a long period. In that event, ". . . the dense planting, drastic and careless tapping, neglect of disease control, would affect their total output more quickly than in the case of estates, unless some new planting is carried out each year."[10]

Soil

Rubber is grown with good results in most sections of Malaya below an elevation of 1,000 feet. To be sure, the soils in which rubber is planted are not of a uniform quality, falling as they do into three types - the undulating soil of the hills and foothills; the alluvial soils of the plains and valleys; and the flat, peaty soils of the coast. The first and the last of these groups are the more productive. The light, sandy nature and perfect natural drainage of the first permit deep extensive rooting; similar results are obtained with the coastal soil when it is artificially drained and when sufficient organic matter is present to render it light and porous.[11]

But the most suitable soil for rubber cannot produce high yields unless it is situated in an equable climate without high winds, characterized by a rainfall of 100 inches per year. Rainfall is one of the most important factors influencing yield, the highest yield invariably following after the period of greatest rainfall. In Malaya all these conditions prevail, and as a result the rapidity of rubber tree growth and the yield are at least equal to those of any other rubber-growing country.

[9] Rae, George, "Statistics of the rubber industry," *Jour. Royal Statis. Soc.* (pt. 2), 1938, p. 326.

[10] *Ibid.*, p. 327.

[11] Barrowcliff, M., "Malayan rubber and coconut soils," *Agr. Bul. Federated Malay States*, July 1914, pp. 329-330.

The number of trees planted per acre ranges from 100 to 200; the larger number is customary on the native holdings. Little thinning is done by the natives, but on the estates the density is reduced to 100 trees per acre or less by eliminating the less productive trees. From the time of planting until the trees begin to bear, at about 5 or 6 years of age, there is little cultivation except the eradication of weeds, any necessary drainage, work intended to reduce soil erosion, and prevention and treatment of diseases.

Until recently the estates practiced clean weeding, as contrasted with the native practice of utilizing cover crops or of simply letting the gardens grow up in weeds as a means of conserving the soil. The result of clean weeding has been to expose the soil to direct denudation by heavy rainfall, causing disastrous soil erosion, as evidenced by exposed tree roots. Under these conditions surface soil, with its valuable humus, has been lost.

When the detrimental effects of this practice were finally realized, the estates began to cultivate close-growing cover crops, usually leguminous plants that improve the soil and prevent erosion. Such cultivation is particularly important during the early years of a stand when the trees are unable to provide sufficient shade to protect the soil.

In earlier years rubber acreage was extended by planting of unselected seed; later, seed from the highest-yielding trees was employed. Still later, seed was taken only from proved high-yielding clones, which had originated by bud-grafting. Since the late 1920's yields have been improved through the extensive use of bud-grafting, a process consisting of grafting a bud from a high-yielding tree to a seedling of another tree. This practice, first developed in the Netherlands Indies, prevails on the estates; the natives usually continue to use any seed available. In 1938 the bud-grafted area of the Malayan estates was estimated at 248,000 acres.

Yield

In Malaya, good estate soil planted with ordinary seedlings yields about 500 pounds per acre per year. On poor soil this figure may be reduced to 200 pounds, and on extremely rich soil it may be raised to 700 or more. The average output for all Malayan estates ranges from 400 to 450 pounds per acre. Estate yields differ considerably from those of native holdings. It has been estimated that during 1930-1931 the average yield per acre of native rubber was 475 pounds, as compared with 380 pounds for estate rubber. The larger output per acre of native holdings must be attributed to heavy tapping and, above all else, to the fact that the number of trees per acre on a native holding is almost twice as large as that on a plantation.

Output

Over 99 percent of the rubber produced in Malaya, or in any rubber-producing country, is exported. Hence the figures for the export of rubber (table 3) indicate fairly accurately the approximate output of rubber in British Malaya. The increase in production from about 1905 was rapid and uninterrupted, reaching its peak during 1930-1934 with an average annual output of 436,000 tons, or 52 percent of the world production. The annual output in the 5 subsequent years averaged only 397,000 tons, but this decline was the result of the rubber restriction scheme. It has been

estimated that in the absence of restrictions the average annual production during 1935-1939 would have reached 545,000 tons. The share of Malayan rubber in total world shipments and production rose steadily until 1930-1934, reaching a peak of 52 percent during that period. It declined to 42 percent in the subsequent 5 years, chiefly as a result of competition from Netherlands Indies rubber.

TABLE 3.—*Rubber shipments from British Malaya as compared with world shipments, 1910-1939*

YEAR	EXPORTS FROM MALAYA	TOTAL WORLD EXPORTS	MALAYAN EXPORTS AS PERCENT OF TOTAL	YEAR	EXPORTS FROM MALAYA	TOTAL WORLD EXPORTS	MALAYAN EXPORTS AS PERCENT OF TOTAL
	Long tons	*Long tons*	*Percent*		*Long tons*	*Long tons*	*Percent*
1910	6,313	93,950	6.7	1925	210,915	527,549	40.0
1911	11,485	94,055	12.2	1926	276,996	621,758	44.6
1912	21,147	114,276	18.5	1927	232,402	606,667	38.3
1913	33,378	120,123	27.8	1928	294,446	653,837	45.0
1914	46,652	123,173	37.9	1929	455,545	863,267	52.8
Avg. 1910-1914	23,795	109,115	21.8	Avg. 1925-1929	294,061	654,616	44.9
1915	70,599	170,826	41.3	1930	442,714	821,914	53.9
1916	97,848	214,089	45.7	1931	422,001	798,324	52.9
1917	134,788	278,140	48.5	1932	405,707	708,449	57.3
1918	107,691	219,684	49.0	1933	445,127	851,456	52.2
1919	199,545	399,731	49.9	1934	467,030	1,016,509	45.9
Avg. 1915-1919	122,094	256,494	47.6	Avg. 1930-1934	436,516	839,330	52.0
1920	174,322	341,994	51.0	1935	417,005	872,413	47.8
1921	151,000	301,618	50.1	1936	353,667	856,376	41.3
1922	212,388	406,398	52.3	1937	469,960	1,135,398	41.4
1923	181,698	408,719	44.4	1938	372,046	889,438	41.8
1924	175,996	426,178	41.3	1939	376,755	1,004,680	37.5
Avg. 1920-1924	179,081	376,981	47.5	Avg. 1935-1939	397,887	951,661	41.8

Compiled from statistics of the Bureau of Foreign and Domestic Commerce.

Restriction of production

The first attempt to restrict rubber production in British Malaya was in 1920. The collapse of the post-war boom in the United States and the increased output of rubber, which outstripped demand, caused the market price to fall from 48¢ in 1919 to 16¢ in 1921. In recent years even the latter price might have been considered high, but the cost of production at that time was such that in 1921 the average dividend paid by 138 companies was 2.1 percent, as compared with 22.3 percent in 1919. Of these 138 enterprises, 100 paid no dividends at all.

To remedy the situation the Stevenson Plan for restriction of output with the view of raising prices came into existence on November 1, 1922. Under the Plan, which applied only to Malaya and Ceylon, exports from regulating countries were to be fixed quarterly in terms of a percentage of "standard production," related to output in each rubber holding during the year ending October 31, 1920. A producer had the privilege of exporting more than the basic quota providing he paid a higher duty, which increased progressively up to 1s. (23¢) per pound for an excess of over 100 percent. The duty on rubber exports not exceeding the permissible quota was only 1½d. (2¢). The punitive duty was an effective deterrent to excess exports. Changes in the percentage exportable were to be governed automatically by the London price of ribbed, smoked sheet. The pivotal price was originally set at 1s.3d. (29¢), but early in 1926 was raised to 1s.6d. (34¢). If the price in any quarter averaged more than the pivotal price, the quota was increased in the following quarter by a specified

percentage, and was decreased by a specified percentage if the price averaged lower than the pivotal price.

The main purpose of the Stevenson Plan was to stabilize the price at 1s. 3d. (29¢), and later at 1s. 6d. (34¢), per pound, which, it was believed, would give the planters a "fair" return on their investments. In actual practice the Plan was used for raising prices far above what had been defined originally as a fair price. This fact became obvious during the boom period 1925-1926, as evidenced by the relationship between permissible exports and the average market price. Exports - or, to all intents and purposes, production - were restricted to 50 percent of "standard production" for 3 months while the price ranged from 35 to 39¢; to 55 percent while the price ranged from 39 to 78¢; to 65 percent while the price rose from 78 to 88¢; and to 75 percent while the price was reaching a peak of $1.23 a pound. At the same time prices were rising, costs of production were declining through the vigorous application of scientific research and advanced production techniques. By the middle 1920's the cost of producing a pound of rubber was below the estimated 19¢ upon which the pivotal prices of the Stevenson Plan had been based.

The weakness of the Plan may be traced in part to the fact that "The automatic determination of supplies by the price and the practical difficulties of altering the percentage more frequently than once a quarter made the scheme too slow in effecting the necessary adjustments."[12] Furthermore the exorbitant prices, which enabled producers to reap huge profits, stimulated planting in unrestricted areas, particularly in the Netherlands Indies. This foreshadowed a great increase in world output in the early 1930's, when the trees planted at the height of the boom would begin to be tapped. Any fear of a shortage disappeared. The burden imposed on consumers by the Plan stimulated the use of substitutes. It was estimated that utilization of reclaimed rubber in the United States had increased to such an extent that the demand for crude rubber had been reduced by 15 percent. As a result prices began to fall sharply; new measures to prevent this downward trend met with no success, and on October 31, 1928, the Stevenson Plan was repealed.

From 1928 until early 1934 the crude rubber industry was not subject to regulation. This era of *laissez-faire* coincided with one of the worst economic depressions ever recorded, and as far as rubber growing in Malaya - or for that matter, in any other region - was concerned, the results were disastrous. Early in 1933 rubber sold for as little as 3¢ a pound.

This state of affairs compelled all crude rubber producers to effect an international agreement with a view to maintaining a price reasonably remunerative to efficient producers.[13] The new scheme proved to be fairly flexible in adjusting exports to demand without raising prices to unreasonable levels. During June and July of 1934, the first 2 months of application of the plan, the quantity of rubber released was equal to the basic quota. Since then, however, and through 1940, the ratio of allowable exports to the basic quota has ranged from 45 percent to 90 percent. The figure was raised to 100 in the first quarter of 1941 in order to meet the pressing demand for crude rubber.

[12] Rae, George, *op. cit.*, p. 369.

[13] The main provisions of the agreements of 1934-1938 and 1938-1943 and their effects on both producers and consumers were outlined in the September 1940 issue of *Foreign Agriculture*.

Decreased output caused a considerable reduction of accumulated stocks. This reduction, in addition to the increasing economic activity in the United States and other rubber-consuming countries, had much to do with the increase in prices from 13¢ in 1934 to 24¢ in March 1937. The business recession and restricted demand that accompanied it through 1938 caused the committee to cut the exportable percentage to 45 percent for the last half of 1938 and thereby to reduce stocks and raise prices to the current level of approximately 20¢ per pound.

The International Rubber Regulation Agreement has not prevented fluctuation in the price of rubber from a figure close to the cost of production to prices remunerative to even inefficient producers. Yet the fluctuations have been kept within a much more limited range than that which characterized the Stevenson Plan. Malayan producers of crude rubber have benefited from the application of the agreement, even though the peak price of 1937 was less than one-fourth that of 1925. At the same time rubber consumers have fared much better than under the restriction of the 1920's. It is evident that the economic plight of the growers would have been serious had not restriction been effected, for the annual world potential production probably would have been 1.8 million tons, whereas consumption does not exceed 1 million. Restriction, therefore, has held in check the enormous potential supply and allowed the price of rubber to rise from the low prices of the depression years to approximately the corresponding levels of other basic unrestricted raw materials. It must be emphasized, however, that regardless of the effects of the restriction scheme, the improvement in the price of rubber must be largely attributed to the increase in the rate of absorption in the United States and other consuming countries during the years of economic recovery.

Rice

As in practically all Far-Eastern countries, rice is Malaya's "staff of life." Moreover, Malaya shows no tendency to substitute other grains for rice as do a number of countries, since 99 percent of the population still subsist on this cereal. Rice growing is carried on only by the natives,[14] in holdings ranging in size from 2 to 7 acres. Although rice is cultivated throughout Malaya, the acreage and output vary considerably from region to region, usually in inverse proportion to the acreage of rubber growing.

The majority of Malayan rice producers are in the Unfederated Malay States, where rubber cultivation is not so extensive as in other parts of the peninsula. Two of the Unfederated States, Kedah and Kelantan, are responsible for more than half the total Malayan rice output. In the Federated States only Perak is an important producer. In the Straits Settlements rice is grown in some quantities in the Provinces of Wellesley and Malacca. In Singapore, where the density of population is greatest, hardly any rice is produced.

Soil

The rice soils of Malaya are chiefly the alluvial tracts of the west coast and the banks of the rivers. Small plantings, however, are located at the more elevated

[14] According to Consul Roy E. B. Bower's report prepared in 1931, the Chinese and Indians together cultivate only 17,000 acres of rice.

points of the valleys, in the low foothills, and even on the steeper hills where good soil is found. The best rice soils of Malaya contain a high proportion of clay and silt, and very little sand.

Irrigation

Water is the all-important element in rice cultivation. Approximately 93 percent of Malaya's rice acreage is irrigated, as compared with 7 percent under the "dry" system. Like the farmers in other rice-producing countries, those in Malaya have developed their own crude irrigation systems. In addition, in 1932 a Drainage and Irrigation Department was established for the purpose of increasing the output of rice through the improvement of the existing irrigation systems and the opening of new lands suited for rice cultivation.

The newly opened lands are all in the Federated Malay States, since the land reserves of the Straits Settlements are already fully utilized. However, in the Straits Settlements the government irrigation schemes, which extend over more than half the ricelands, have increased the yields beyond the levels attained when the land is irrigated by the simple methods of the farmers. In 1938 the total rice area served by government irrigation enterprises was estimated at 153,000 acres. At that time the cost of establishing such enterprises was believed to be about $22,589,446.

TABLE 4.—*Rice in British Malaya, 1921-22 to 1938-39; acreage, production, yield, imports, and consumption*

YEAR	ACREAGE	PRODUCTION (CLEANED)	YIELD PER ACRE (CLEANED)	NET IMPORTS (CLEANED)	CONSUMPTION (CLEANED)	PERCENT OF PRODUCTION TO CONSUMPTION
	1,000 acres	*Million pounds*	*Pounds*	*Million pounds*	*Million pounds*	*Percent*
1921-22	644	473	735	815	1,288	37
1922-23	657	526	801	811	1,337	39
1923-24	652	502	769	883	1,384	36
1924-25	656	535	816	903	1,438	37
1925-26	654	415	635	1,064	1,478	28
Average	653	490	751	895	1,385	30
1926-27	650	427	657	1,223	1,651	26
1927-28	663	454	685	1,174	1,628	28
1928-29	687	425	618	1,236	1,662	26
1929-30	657	359	547	1,326	1,684	21
1930-31	708	592	836	1,156	1,747	34
Average	673	451	671	1,223	1,675	27
1931-32	725	663	914	917	1,579	42
1932-33	767	672	876	970	1,642	41
1933-34	765	755	987	1,015	1,770	43
1934-35	735	742	1,009	1,064	1,805	41
1935-36	725	766	1,057	1,197	1,962	39
Average	743	720	969	1,032	1,752	41
1936-37	740	715	966	1,284	1,998	36
1937-38	727	670	922	1,371	2,041	33
1938-39	753	765	1,016	1,476	2,240	34

Malayan Agricultural Statistics, 1939.

Malaya's food problem

Despite the attempt to expand the output of rice, Malaya continues to depend on imports of this cereal for two-thirds of its requirements. The dependence on imports is the country's basic food deficit problem, which has grown more important as

population has increased. More recently, with the threat of war hanging over southeastern Asia, the problem of adequate food supplies has assumed special gravity.

In the years when rubber growing was increasing rapidly, little attention was paid to rice. Some of the rice holdings were converted into rubber holdings, and most of the newly cleared lands were developed as rubber plantations. Native farmers have preferred rubber because it requires less work, and in years of good prices the profits greatly exceed those from rice farming. Although since the turn of the century the rubber area has increased from a few thousand acres to over 3 million, that of rice has increased but slightly. The average rice acreage during 1935-1939 was 734,000 acres, compared with 653,000 acres in 1922-1926. This increase of 81,000 acres has taken place largely in the past 8 years, when the considerably reduced profits from rubber growing, together with the movement to make Malaya as nearly self-sufficient as possible in food, have reawakened somewhat the interest in rice cultivation.

Throughout the 1920's the yields declined, but since then more widespread utilization of high-yielding strains and improved irrigation have brought about a rise in yield per acre from 25 to 36 bushels of rough rice, or 670 to 970 pounds of cleaned rice. Even the higher figure is only about half of that prevailing in Japan. This increased yield, together with the larger acreage, raised the total output from 16.6 to 26.6 million bushels, or by 60 percent.

Annual per capita production in Malaya is only about 145 pounds, whereas consumption for food is about 350 pounds. Even the Unfederated States, the rice center of Malaya, produce only two-thirds of their needs, and the Federated States and the Straits Settlements produce but 25 and 17 percent, respectively, of their consumption. The remainder is obtained from Thailand particularly, and from Indochina, Burma, and India. With total consumption rising from 1,288 million pounds in 1921 to 2,240 million in 1938, net rice imports during the same period increased from 815 to 1,476 million pounds, averaging 1,104 million pounds per year.

The prospect of attaining self-sufficiency in rice is not promising in Malaya. The difficulty is twofold. The principal obstacle is the enormous task of almost trebling the present rice acreage. On the basis of average yields and consumption during 1935-1939, Malaya would have to plant 2,065,000 acres of rice in order to become independent of imports, or 1,331,000 acres more than the average annual planting during the past 5 years. It has been estimated that a further rise in yields could reduce this figure to 900,000 acres. Malaya has sufficient land reserves for this purpose, but the work and financial expenditures involved in clearing and irrigating such a vast area of swamp and jungle land are formidable obstacles to their use.

The second difficulty is due to the fact that although there are hardly enough natives to cultivate the new land, Chinese and Indians are not permitted to grow rice. The Malays view rice cultivation as their own inalienable right. According to the Governor of the Straits Settlements, the production of rice in Malaya could be greatly increased if only there were enough farmers interested in its cultivation.[15] He suggested, therefore, that Chinese and Indians be permitted to grow rice, and added that "There is no question of depriving the Malays of the use of any land which they can cultivate; the map will show you that there is ample for them and for others as well."[16]

[15] From an address delivered on or before the Sixteenth Exhibition of the Malayan Agri-Horticultural Association on August 5, 1939.

[16] *Ibid.*

In view of the strong protests with which this suggestion was met, it is problematical whether the non-Malays will be permitted to enter the rice industry, since recently the issue has not been pressed. Meanwhile, almost on the eve of the outbreak of war, the British Administration decided to add as much land as possible to the present acreage within the next 2 or 3 years. In the words of the Governor of the Straits Settlements, The details [of the plan] are not yet quite ready, but we are prepared to pay for the clearings and planting up of land and perhaps to guarantee a minimum price for the crop for the first few years."[17] This was in effect an offer of a government subsidy, never before extended to the native farmers.

With the outbreak of war, and more recently with Thailand-French hostilities and the threat of a Japanese-British conflict, the question of rice self-sufficiency has become even more pressing. The government has therefore urged the plantation owners to set aside land that would yield a sufficient volume of rice to feed the workers employed there. The expansion of the output of vegetables, particularly of tapioca and sweetpotatoes, is also advocated. In addition, severe restrictions placed on foodstuff exports are expected to bolster up domestic supplies to some extent.

The rubber plantation owners are wary of the idea of turning some of their land into rice fields for the fear that such a course might adversely affect the future plantings of rubber. But since "an assured food supply in the next twelve months is much more important than the rubber crop of 1950,"[18] the planters may yet be induced to grow some rice. But the chief reliance is still on the native farmers, who have always been the country's rice producers. With the aid of promised subsidies, some success will probably be achieved, for the production of more rice for Malaya is looked upon as one of the country's inescapable war duties. Nothing, therefore, is expected to stand in the way of achieving a better balance between production and consumption of rice.

Coconuts

Next to rubber and rice, coconuts constitute Malaya's most important crop. They are a source of food, drink, fuel, and many other necessities of life, as well as a significant export item. The crop suffered for many years from a depressed market, but the use of nut oils for margarine and other purposes, popularized during the World War, has had a favorable effect on coconut growing.

The coconut palm in Malaya grows on all types of soil, but on the west coast and in the inland areas it is usually cultivated on heavy clay soil. When properly drained this soil proves itself well adapted to cultivation of the coconut tree. On the east coast the palms grow on sandy soils, which yield greater crops.

A coconut palm begins to bear fruit between the fourth and sixth year after planting, reaches maturity in the tenth year, and may continue to yield fruit for 60 years or more. A good palm in full bearing will yield as many as 80 to 100 nuts per year, but the average is about 50 nuts, or about 2,500 per acre. The nuts are

[17] From a radio address delivered on September 24, 1939.

[18] Bretholtz, Hilda A., quoting an authority on the problem in "Malayan food program becomes more pressing," *Far Eastern Survey*, Nov. 6, 1940, p. 264.

collected every 2 to 2½ months. The Malayan coconut is distinguished by its size. Only some 4,000 nuts are required to produce 1 ton of copra, as compared with 6,000 required of the kind grown in most other countries.

The coconut palm is found throughout the country, but a distinction must be made between the relatively small inland plantings, surrounding the Malayan homesteads, and the large acreage on the low coastal plains and near the banks of the lower reaches of the rivers. In 1939 the total coconut palm area was estimated at 615,000 acres. The chief producers were the state of Johore, with 172,000 acres; Perak, with 117,000; Selangor, with 110,000; and Kelantan, with 57,000. This is essentially a native crop; only 115,000 acres, or 19 percent of the total, are in holdings of 100 acres and more, while most of the remainder is made up of holdings of only a few acres each.

Accurate data are not available concerning the output of coconuts. The product enters largely in the diet of Malayans and Indians, and it is estimated that local consumption, in terms of copra equivalent, was about 59,000 tons in 1938, on the basis of 100 nuts per head per year. Total exports in the same year in terms of copra amounted to 151,000 tons. Copra prices in 1938 were low, and large unrecorded stocks were accumulated in the hands of dealers. For this reason exports and consumption figures are not sufficient to estimate the total coconut output of Malaya. In recent years coconut oil was the chief coconut export product; copra, fresh coconuts, and copra cake followed. The export value of all these products in 1938 amounted to $6,553,000, as compared with $10,124,000 in 1937; the decline was due entirely to a decrease in prices. Before the outbreak of the present war Great Britain, Germany, and the Netherlands were the principal consumers of Malaya's coconut products.

Pineapples

Among the primary crops of Malaya, pineapples are gradually increasing in importance. Next to Hawaii, Malaya is the largest exporter of this fruit. Pineapples were originally considered a good crop to plant with rubber, and as rubber planting increased, the area under pineapples likewise increased. This system was utilized successfully by the Chinese, who were chiefly responsible for the development of the pineapple industry. From the end of the twenties, the tendency to prohibit further alienation of land for rubber planting and the rising demand for pineapples have resulted in a rapid increase in the planting of pineapples as a main crop; in 1938, approximately three-fourths of the pineapple area of 67,000 acres was planted with pineapples as the sole crop.

With few exceptions, the plantations - even where pineapples are the sole crop - are not operated as large-scale units comparable to the rubber or coconut estates. The prevailing practice is for the Chinese, who own both the canneries and the land, to distribute the land among Chinese tenants. They erect temporary homes on the land, set out the plants, and keep the land clean. In addition to a fixed rate for cultivating the land and raising the crop, the tenant receives about 50 percent of the value of the crop.

Malaya possesses suitable conditions for cultivation of pineapples. The sandy, well drained soils, properly distributed rainfall, and constant climatic conditions permit two main crops to be harvested annually. Practically no fertilizer has been used in improving the soil and raising the yields. It was not deemed necessary to use

it when the crop was a subsidiary to rubber, for once rubber attained maturity, the land had to be cleared of the pineapple plants. Nor is manuring used where the pineapples are planted as a major crop, chiefly because the worn-out soil can be abandoned in favor of newly cleared jungle land.

The most common method of field planting is the single-row method, with the plants spaced at 2½ feet and the rows 5 feet apart. Such spacing allows from 3,000 to 3,400 plants per acre. Yields could be increased considerably by closer planting, but at present the first crop, harvested between 15 and 18 months after planting, yields from 1,200 to 1,500 fruits per acre. After the plants come into full bearing, the first four crops usually yield from 4,000 to 5,000 pineapples, weighing 4½ pounds each, per acre per year. These crops are followed by three or more crops smaller in number and poorer in quality.

The total quantity of fruit produced is unknown. A great deal of fresh fruit is eaten in Malaya, and considerable amounts of varieties suitable only for this purpose are grown. Because the local consumption of canned pineapples is insignificant, it is possible to estimate the output of canned pineapples by adding exports and stocks. Average annual exports during 1934-1938 amounted to 74,000 tons, valued at about 5 million dollars. The largest single market for Malayan canned pineapples is Great Britain, and the next is Canada; the two consume from 80 to 85 percent of Malaya's exports.

In spite of the fact that Malaya is an important producer of pineapples, the position of the industry has been far from satisfactory, especially since the development of pineapple growing into a principal crop industry. Expansion of exports has been possible only because of the cheapness of the product, which, since it is of low quality, caters to a market different from that which absorbs the Hawaiian pineapple.

To place the industry on a sounder basis the Government of British Malaya has enacted a number of measures. From October 1, 1934, registration of pineapple factories and cannery marks was required. This legislation was designed to improve the sanitary conditions of the factories and the quality of the canned fruit, by identifying the establishment in which they originated. As it proved to be insufficient to insure better-quality products, additional provisions were enacted in 1938 in the form of the Malayan Mark Pineapple Regulations, commonly referred to as the "Trade Mark Scheme." By this scheme all pineapples are divided into two grades, "Golden" and "Standard," and specifications to which the fruit must conform in order to qualify for these two grades are laid down.

During the past decade the demand for Malayan pineapples has expanded, yet prices have been so low as to leave hardly any profit. This situation has been ascribed to overproduction and excessive competition. A remedy has been sought in the establishment, in 1938, of a Central Board of Pineapple Packers, with the object of adjusting output to market requirements. All pineapple factories have become members of the Board. A committee of the Board is authorized to fix the quantity of all grades of canned pineapples to be produced during each season, and to distribute the output among the members of the Board in proportion to the productive capacity of each factory. The output of each factory must be sold to the Board at a price fixed by it. This body must also set the price at which it will sell the output to exporters.

Such, in the main, are the provisions to improve the quality, raise the price, and eliminate the ill effects of overproduction and cutthroat competition from the Malayan pineapple industry. It remains to be seen whether these measures will reorganize and develop the industry to the point where it could serve as a substitute for rubber, continuing in off-seasons, and become an important source of revenue in Malaya.

Oil Palms

The cultivation of the oil palm in British Malaya is one of the country's newest industries. It is true that the tree was first introduced from Africa in 1875, but for about 40 years it was cultivated as an ornamental plant. However, the post-war demand for vegetable oils and fats, and the decline in rubber prices in 1921, led to a serious attempt to cultivate the oil palm on a large scale for commercial purposes.

With a rainfall of from 60 to 80 inches, evenly distributed throughout the year, the oil palm grows on a wide range of soils. The soils that give most satisfactory yields are very permeable and possess a fairly high humus content, for they permit root penetration and retain moisture. In Malaya such soils are found on the alluvial coastal land and inland river flats.

The number of palms per acre varies between 48 and 55, depending on the system of planting. The trees come into bearing at the end of the third or fourth year and reach maturity during the tenth. It is estimated that under normal conditions an acre of oil palms in its fourth year yields 500 pounds of oil; at from 5 to 6 years of age, 1,000 pounds; 7 to 8 years, 1,400; 9 to 10 years, 1,600; and 10 years or more, 1,800 pounds. The corresponding yields of palm kernels are estimated at 100, 200, 280, 320, and 360 pounds per acre.

The acreage planted to oil palms has increased very rapidly, from an estimated 3,000 acres in the early 1920's to 76,000 acres in 1939. In addition to this area, 37,500 acres was reserved for future use. The growing of oil palms is a plantation industry developed only by Europeans. In 1939 the entire acreage was distributed among 48 large establishments. Of this number 9 planted 51,000 acres, or 67 percent of the total land under oil palms; 19 planted from 2,000 down to 500 acres each; and the remaining 20 planted less than 500 acres per estate, or a total of 4,800 acres. The existence of such large holdings is favored particularly by the practice of installing factories on the estates to process the fruit.

Production has more than kept pace with the extension of acreage, for as the palms have approached maturity their productivity has increased. Thus between 1931 and 1939 the output of palm oil increased from 5,100 tons to 57,300, and that of kernels from 773 to 10,200. The large increase in production is reflected in a steady rise of exports, which may be considered as comprising nearly the entire production. Nevertheless Malaya, with its oil and kernel exports in 1938 amounting to 3.8 million dollars, still remains a negligible factor in world export trade of these products.

Secondary Crops

British Malaya has also 11 secondary or minor crops, which cover an area estimated at 278,000 acres. Of this area 6,500 acres are devoted to spices. Although at one time Malaya was an important producer of spices, the present output does not meet

domestic needs. There is a net import of ginger, cloves, pepper, cinnamon, and other less known spices. This is also true of the 4,000 or more acres in tobacco;[19] to satisfy local demand Malaya's imports in recent years have averaged approximately 15 million pounds per year. The areca nut (betel nut) crop, produced on 62,000 acres, is intended not only for human consumption but also for export; net exports of this product amounted to 34,000 tons in 1938.

Tapioca, or cassava, was until recently grown only with rubber, but since the introduction of rubber restrictions this practice has ceased. In 1938 the area under tapioca grown alone was 11,000 acres, of a total of 24,000 acres devoted to that product. Net exports of tapioca products amounted to some 16,000 tons. There are also nearly 10,000 acres in Malaya under derris root, about half of which is produced as a secondary crop, planted with another. The principal use of derris is as an insecticide.

During the latter part of the nineteenth century coffee production was important in Malaya, but plant disease and rapid development of rubber growing almost spelled the doom of the crop. At present some 23,000 acres are planted to coffee of the Liberian variety, but of this area only 5,000 acres are devoted entirely to coffee. Assuming that three-fourths of the area planted was in production and the yield of prepared coffee was 533 pounds per acre, production in 1938 was 9 million pounds. In the same year it was necessary to import 16 million pounds to satisfy domestic needs.

Tea, like coffee, has long been cultivated in Malaya. At about the turn of the century tea growing was well established, but because of the competition of rubber, interest in tea declined as early as 1910. Before 1930 the total tea area did not exceed 1,200 acres. Shortly after that date, however, the Cameron Highlands were opened, and there followed so great an influx of planters that by 1938 the total area in tea had increased to 6,158 acres. Only 559 acres were in small holdings, the rest being concentrated in a few large estates.

The output from the estates amounted to 1,217,000 pounds and that from the small holdings to about 250,000, or a total of 1,467,000 pounds. The yields of tea from lowland estates somewhat exceed those of the highlands. In the former, plants 4 to 5 years old yield 500 pounds of tea per acre, and plants 10 years old average from 900 to 1,000 pounds. Investigations of the Government Experiment Station at Serdang indicate that an acre of mature plants, if properly cultivated, on a lowland estate may be expected to yield 1,200 pounds of tea and on a highland plantation from 850 to 900 pounds. It was estimated, therefore, that in 1942 the output of the present estate acreage will be 2.5 million pounds. This, however, will fall far short of domestic requirements, for in 1938 net imports amounted to 3,465,916 pounds.

On January 1, 1937, British Malaya joined the Tea Regulation Scheme, organized in 1933 by India, Ceylon, and the Netherlands Indies. In so doing Malaya undertook to plant no more than 3,000 additional acres before March 31, 1938, and thereby to restrict the total area under tea to 6,000 acres. The new agreement for 1938-1943 permitted Malaya to add 10,000 acres within the 5 years covered by the scheme.

This is expected to inaugurate a new era for the tea industry of Malaya and, incidentally, help to diversify its agricultural economy. The new developments are

[19] Tobacco occupies the land for about 3 months only, so that the area actually cultivated during a year may be considerably larger than that planted at any one time.

expected to center in the Cameron Highlands district, which is well suited for tea cultivation by virtue of the good soil, proper altitude, sufficient rainfall, and an area of at least 30,000 acres available. There is good prospect, therefore, that before long Malaya will succeed not only in producing all the tea it consumes, but also in becoming a net exporter of the commodity.

FOREIGN TRADE

Both British Malaya and the Netherlands Indies are important producers of tropical products and of certain minerals that are shipped abroad. However, whereas the Netherlands Indies produces most of its own basic food, the one-sided agricultural development of Malaya makes it necessary to import the greater part of the food it consumes. For this reason Malaya is particularly dependent on its foreign trade.

The average annual export trade of Malaya during 1925-1929 amounted to 608 million dollars, and its imports to 545 million, or a total of 1,153 million dollars. As a result of the depression foreign trade had by 1933 shrunk to only 40 percent of the 1929 level, recovering to 59 percent during 1934-1938.

Malaya exports a variety of agricultural and mineral products, but even a cursory examination reveals that more than two-thirds of the export trade is agricultural. Rubber accounts for over four-fifths of the total value of agricultural exports and for more than 50 percent of all exports. The output of copra, areca nuts, palm oil, pepper, coffee, and a few other items is relatively small; the volume shipped abroad cannot challenge the supremacy of rubber. Tin is responsible for 69 percent (average annual 1936-1938) of the total value of nonagricultural exports.

The conclusion to be drawn is that British Malaya's export trade is determined by two basic factors. The first is the overwhelmingly agricultural character of the trade, with the exception of tin mining; the second is the fact that Malayan agriculture is highly specialized and that the country is therefore far from self-sufficient with respect to its food supply. Due to the absence of extensive grazing land, the breeding of livestock is carried on to only a very limited extent, and pigs from India and frozen beef and mutton from Australia are imported in large quantities. During 1934-1938 the annual imports of goods under the general group "animals, food, drink, and tobacco," averaged 28 percent of the value of all imports.

Even more important are imports of manufactured goods, since the industrial development of the country is negligible. Moreover, rubber estates and tin mines require the use of a great many machines, all of which are imported from abroad. Thus, raw materials wholly or chiefly manufactured constitute 72 percent (1934-1938) of all imports.

Trade With the United States

The United States is the principal purchaser of Malaya's surplus products. During the late 1920's the United States accounted for 45 percent of Malaya's exports; this share declined somewhat in subsequent years, but it still amounted to almost 39 percent during 1934-1938. The explanation lies in the large shipments of rubber and tin to the United States. Thus in 1939 this country took 80 percent of the rubber and 69 percent of the tin exported by Malaya.

United States imports from Malaya averaged over 185 million dollars annually during 1937-1940 (first 11 months of 1940), or 7.7 percent of total imports. This figure may not seem large, but stated in another way, it means that the United States depended on Malaya for 58 percent of its rubber and 72 percent of its tin (annual average 1937-1939). The other items of trade are of little importance, either from the point of view of Malaya's exports to the United States or American imports from Malaya. But the significance of the rubber and tin trade to the economy of the two countries cannot be overestimated.

Although the United States is the principal customer for Malaya's two staple products, Malaya purchases less than 5 percent of its total imports from the United States, and the share has declined in recent years. American exports to Malaya in 1937-1940 averaged $10,345,000, or only 0.3 percent of total United States export trade. Metals, machinery and vehicles, chemicals, petroleum, textiles, and a number of other nonagricultural products constitute the bulk of American exports to Malaya.

CONCLUSION

In the course of four or five decades British Malaya has been transformed from a backward country to one of the richest agricultural regions of the Orient. This change has been effected chiefly by large-scale cultivation of a single important export crop - rubber. Proper climatic conditions, the availability of suitable soil, the government land and labor policies, and the application of agricultural science have served to accelerate this development. Foreign investments in Malayan rubber plantations have grown to about 275 million dollars, and from an agricultural point of view Malaya has become primarily a rubber country.

The planters, the rubber manufacturers, the treasury of the Malayan Government, and all other interests connected with the industry have been richly rewarded by the mounting production and exportation of rubber. The tendency is to view these financial gains as an index of progress of colonial society and colonial rule. It would be erroneous, however, to judge the value of this development from the standpoint of these interests alone; the question remains as to the welfare of the native farmers under the impact of a dominating plantation industry, fostered by the British colonial administration.

The general proposition ". . . that no dependency has ever been drawn within the scope of imperialist control in the interest of the dependent society itself,"[20] is true of the British rule in Malaya. Imperial considerations and the "legitimate" activities of foreign entrepreneurs came first, even though they infringed on the standard of living and political aspirations of the natives. Yet it must be recognized that the indirect as well as the direct effects of Malaya's net political and economic structure were not without their benefits.

Among the benefits enjoyed by the native farmer as an indirect result of the new economic order are the security of property rights and liberation from the arbitrary dictates of the native chiefs; an end to local warfare and the opportunity of peacefully tilling his own fields and of enjoying his economic gains as he sees fit; and such improvements as better sanitary conditions and transportation facilities.

[20] Emerson, Rupert, *Malaysia, a Study in Direct and Indirect Rule*, New York, 1937, p. 467.

It is difficult to measure such benefits in terms of economic well-being, but they may not be discounted.

With respect to the direct effects, it must be noted that the natives are now responsible for one-fourth of the total output of rubber. Agricultural science, extensively applied on the plantations, is little known on the small-scale native farms, but some of the benefits of improved agricultural methods and better seeds have been made available to the farmers by the expanding Department of Agriculture, experiment stations, and their respective field services. In general, however, such economic gains as have been made by the natives are insignificant compared with those achieved by the Europeans and Chinese; they are merely "accidental byproducts" of a new economy, in the development of which the native's role has been essentially that of an onlooker rather than of a participant.

Land utilization in Malaya during the past four decades has had one primary object - more land planted to rubber. Even land unsuitable for rubber production was utilized. The native farmers, too, were carried away by the profits of rubber growing; as a result production of many other crops, giving reliable but smaller profits, has been neglected. Rice cultivation was no exception, a fact that explains why Malaya must import two-thirds of its rice requirements.

The ill effects of this high degree of specialization are especially apparent in wartime, when the danger of food shortage seems imminent, but even in peacetime the one-sided development of the country's agricultural economy has a serious drawback: the economic welfare of the entire plantation industry and of a great many native farmers is tied up with the success or failure of a single crop. Only a more nearly balanced agricultural economy, necessitating a program of diversified farming, could avert the danger inherent in this situation.

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